THE NEW YORK STATE

CONSERVATIONIST

August-September 1953

STATE OF NEW YORK

CONSERVATION DEPARTMENT

CONSERVATIONIST

Financing fish and game

We hear it all the time: *Why doesn't the Department hire more Game Protectors?*

There are lots of different ways of asking this question. One fellow wants to know the answer; another fellow, pounding the table at a beery session of his rod and gun club, may ask it (and supply his own answer) as a prelude to a frontal attack on "the whole damn Conservation Department." The question, however, remains the same, and we've got to admit that we get some satisfaction from the fact that it's asked so often: apparently there is general agreement that Game Protectors are a good thing, and that you can't have too much of a good thing. The Department subscribes to this view.

Well then, why *doesn't* the Department hire more Game Protectors? The answer is very simple: The Department doesn't want to hire them and then find out, a few months later, that it's got to fire them because there's no cash left in the till to pay their salaries. Yes, there's cash in the till right now. And it could be used to hire more Game Protectors. But please remember that the Legislative action which made this cash available—the bill that provided for increased license fees—was made effective for only three years, and the three years are about up. What the Legislature will do next, we don't know. This being the situation, would *you* hire more Game Protectors?

The hiring of law enforcement officers is merely a case in point; the fact is that *no* important part of a sound, long range program for fish and game conservation can be undertaken on a hand-to-mouth, year-to-year, or even a three-year to three-year basis. Modern fish and game conservation requires planning for many years in advance, and still more years for the plans to bear fruit. You may have the money to build a fish hatchery in 1953, but surely you wouldn't build it without assurance of funds to operate it beyond 1956. You have no such assurance now.

On page 12 of this issue there is an article that tells you how your license dollar is being spent at the present time. We have done the best we could with that dollar, in spite of the uncertainty of the future. But we hope this article also makes it clear that what we *really* need, what *any* broad conservation program really needs, is sound, predictable, long range financing.

Therefore the Department, hoping The Conservation Council will reaffirm its approval, will introduce legislation at the coming session to make the present license fees permanent—Editor.

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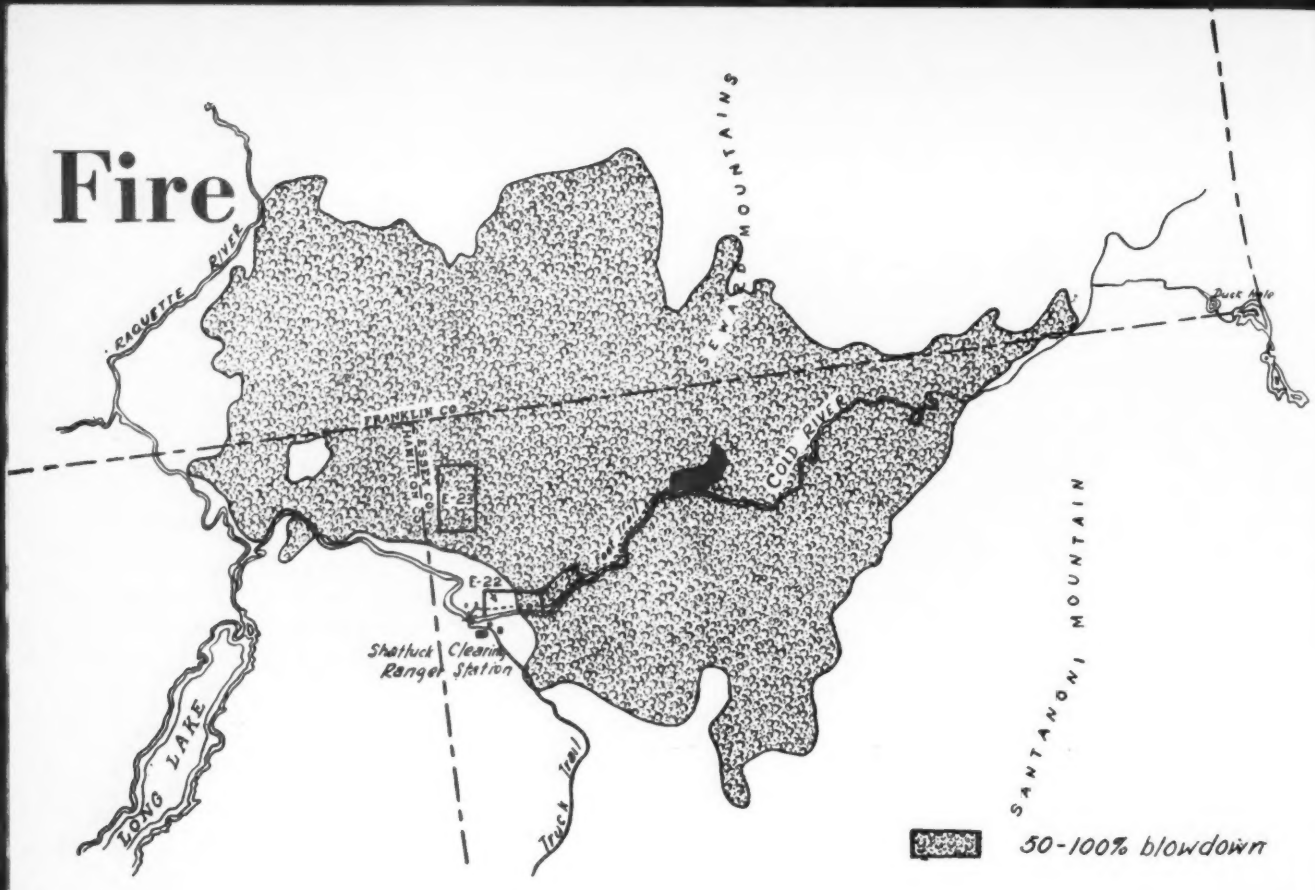
Fire



in the Cold River blow-down

Late in the afternoon of Saturday, July 18, a nightmare which has been haunting us for more than two years became a reality; Forest Ranger Earl Blanchard, stationed at the Shattuck Clearing Ranger Headquarters, spotted a finger of smoke spiralling up from a point about four miles away on the Cold River. A fire had started in the blow-down.

Only those who have seen this country since the hurricane of November, 1950 could appreciate what it meant to us when Ranger Blanchard reported that fire. The Cold River country, as remote and inaccessible as any area in the State, includes approximately 10,000 acres on which the timber was virtually one hundred per cent leveled by the hurricane. Because of the inaccessibility of this country it has been extremely difficult to let salvage contracts on the blow-down, with the result that the majority of the area remains to this day a shambles, with most of the down timber so stacked and piled that the branches have dried out instead of rotting—as they would have done if it had been possible to get them down on the ground. Needless to say, such a situation represents an acute fire hazard. Hence the troubled sleep of our Forest Rangers.

The potential dangers, however, have long been recognized, and when Ranger Blanchard reported the fire it was only necessary for Solon Hyde, Superintendent of our Bureau of Forest Fire Control, to thumb through his book and dig out the plan for a "campaign fire" in the Cold River area. (Such plans, as well as the training of men to execute them, are largely the result of our participation in the Northeastern Forest Fire Protection Commission, an inter-state co-operative organization described in detail in previous issues of this magazine.) Included in this plan (which has been kept up to date according to the latest information) are lists of equipment and personnel available in the area, specific plans for their use, as well as procedures to be used in establishing communications, feeding and resting the fire fighters, and other important parts of a fire fighting program—all worked down to the last detail.

Plans, however, exist only on paper. To put them in operation the right men and the right tools (and enough men and tools) are required.

and there was no shortage of either on the Cold River fire. In fact, according to Fire Boss Bill Petty, the response to his requests for help was sensational and heart-warming. The help included a minister from Newcomb who worked 'round the clock making sandwiches, volunteers in shorts and sneakers from the Department's campsite at Lake Eaton, and lumberjacks lugging their pet chain saws. Plans don't put out fires, but these people did. They ought to get the credit, and we're more than glad to give it to them. Without their help, there's no telling when or where the Cold River fire would have ended up.

The following is a chronological account, based mainly on a running log kept in the Albany office, of what happened in getting the Cold River fire under control. We don't want to make a mountain out of a molehill—we could have and we expect worse fires—but this report should indicate our administrative strategy.

Saturday

LATE in the afternoon, a thunder storm with a great deal of lightning but little rain passed over the Cold River country. Shortly after the passage of this storm Ranger Blanchard spotted the smoke, and at once radioed District Forester William E. Petty at Ranger Headquarters at Ray Brook. Petty immediately set up dispatch headquarters at Saranac Inn, where he had radio and commercial telephone communication, and where he also was in touch by radio with Shattuck Clearing. At Saranac Inn supplies and equipment had been stored for just such an emergency, and a dispatcher's list (showing the location and means of obtaining all necessary types of equipment and manpower) was available, including the telephone numbers of personnel that could be assigned to perform specific functions on a fire team in this particular area. With this information at hand, Petty assumed the role of Fire Boss, and preliminary crews were immediately dispatched to Shattuck Clearing. The men proceeded from there to the fire on foot 4 miles.

As soon as he was advised of the fire, Petty arranged for a constant aerial patrol by Chief Pilot Fred McLane. McLane maintained radio communication with Petty and also with crews on the ground, who were equipped with walkie-talkies. Meanwhile, District Ranger George Youngs took up his position as Line Boss on the fire, with headquarters at Shattuck Clearing.

About 9:15 p.m., Petty reported that 35 men were on their way to the fire with chain saws, power pumps and a limited supply of hose, and that a team set up and trained for just such a fire was in the process of assembling. Petty reported that the fire was out of control, and would continue out of control some time.

From Albany, Superintendent Hyde notified Director of Lands and Forests Foss and Assistant Director Williams and then started to organize the reserves. At 10 p.m. he reached Communications Officer and Radio Technician Ed. Broland at Speculator and gave him orders to report to George Youngs at the fire with radio equipment, replacement parts, eight additional walkie-talkies, and two battery-operated tower sets with spare batteries. District Ranger George Stewart was directed to proceed at once to Shattuck Clearing from his Lake George headquarters with 1,500 feet of hose, and District Ranger Call at Lowville was directed to provide an additional 1,500 feet.

Sunday

At about 3:30 Sunday morning Petty notified Hyde that all available manpower and equipment would be needed. In Petty's opinion, this was or might soon become a "campaign fire." It was decided to recruit fire fighters and mechanized equipment locally in so far as possible, and to dispatch trained supervisory personnel and specialized equipment from other Forest Districts in the State—preferably from outside the dry Adirondack area so as not to deplete our reserves in the event of other fires breaking out.

At 3:55 a.m. Supervising District Ranger Abe George (on vacation) was contacted, directed to pick up Ranger Stanley Engel in Albany, and report with him to Shattuck Clearing; at 4:05 a.m. District Ranger McCowan of Norwich was dispatched to the fire with 1,500 feet of hose; at 4:15 a.m. District Ranger Hedgecock was directed to dispatch Rangers Barrett and Snyder (from Beacon and Poughkeepsie, respectively) to proceed to the fire with a radio fire truck equipped with a portable power pump and 3,000 feet of hose; at 4:30 a.m. District Ranger Roche at Bath was directed to proceed to the fire with Rangers Bailey and Griffiths, with a power pump and 2,000 feet of hose; at 5 a.m. District Ranger Walsh of Middletown was directed to send Radio Technician and Communications Officer Behren, with additional radio equipment and parts and 4,000 feet of hose; at 5:20 a.m. District Ranger Fohrman at Northville was directed to dispatch Ranger Seeley of Caroga Lake to the fire with a pickup truck, power pump and 1,500 feet of hose.

At 6:30 a.m. Petty was notified of the action taken in dispatching reserves from outside districts. At that time he reported that the fire had burned fiercely throughout the night. A further report on conditions was made immediately to Director Foss, who decided to set up administrative headquarters in the Albany office. On hand were Foss, Assistant Director Williams, and Superintendent Hyde of the Bureau of Forest Fire Control. Hyde continued with his organization of a reserve force; and the following were alerted to be on stand-by for immediate call: Ranger Liddle of Forestport, with one pump and 1,500 feet of hose; Forest General Foreman Meylan and Ranger Carter from Cortland, with one pump and 1,000 feet of hose; and Rangers Gonyo and Carington from Oneonta, with 2,500 feet of hose. (The above were actually called to the scene of the fire Wednesday, July 22, to relieve those who had been called on Sunday). Deputy Commissioner Skiff then contacted General Hausauer, Chief of Staff at the National Guard, and secured clearance for the use of a communications unit if required.

At 9 a.m. Petty reported that the fire was still out of control, although he had had excellent response to his requests for personnel and equipment. Petty also reported that Chief Pilot McLane had advised him by radio that although the fire was burning fiercely, it did not appear to have spread since the previous evening.

At 2:20 p.m. Hyde again contacted Petty, who reported that 12 power pumps were then working on the fire, and that the spread of the fire appeared at that time to have been checked. Also that reserve personnel and equipment dispatched from down-state districts had arrived.

At 4:15 p.m., Abe George (recalled from vacation) reported from Shattuck Clearing that the area had been hit with a rain shower, with rain amounting to 22/100 of an inch. But he also reported that this rain had been accompanied by a severe lightning storm, and that a crew had just been dispatched to Deer Pond where a strike had been observed.

At 5:10 p.m., Pilot McLane reported that a second shower had passed over the area and that as a result only smoke was visible from the fire. At the same time he reported that the construction of a fire

line had been undertaken along a natural barrier about one-half mile ahead of the fire. At 7:30 p.m., McLane reported another heavy shower. And a fireline, he said, appeared to have been established around the eastern half of the fire.

At 8:10 p.m., Petty 'phoned the Albany office to say that it was hoped that a line entirely around the perimeter of the fire could be established before morning, and that he was in good shape with regard to both equipment and manpower. He had 115 men on the fire at that time.

At 8:15 p.m., Col. Webster of the National Guard reported from New York City that his communications unit would be ready to move by 9 a.m. Monday, and that in addition he could provide an M.P. Unit and also a Commissary Unit. The Communications Unit, staffed largely by veterans of the Korean War, could establish a field telephone system of 100 miles. Col. Webster received the heartfelt thanks of our office, but was requested to hold his forces in reserve until further notice.

Because the reserve strength of the Northeastern Compact states might be required on this fire, Executive Secretary A. S. Hopkins was notified early Sunday morning, and he made arrangements to have available on short notice an additional 55,000 feet of hose and other equipment as might be required. But at 9:30 p.m., Petty reported that heavy showers had left his district in good shape. These showers had quieted the fire, but even more important, they had sufficiently dampened the adjacent areas so as to restrict its spread. Petty also reported that a heavy bulldozer was at that time starting to force a supply line to the fire, and that most of the men had been relieved —with a new crew to appear at 4 a.m.

Monday

Petty reported at 9 a.m. that the situation appeared to be pretty well in hand; trying to take advantage of the rains of the previous day, every effort was being made to get more water on the fire. There were still storms in the area, however, and at 6 p.m., Pilot McLane reported a second fire started by lighting at a point about one mile south of the original fire. A crew was immediately dispatched to handle this strike, and it was reported under control before dark.

At 3:30 p.m. District Ranger Youngs, the Line Boss on the fire, reported that the fire line was being held and strengthened; that three bulldozers were pushing a temporary road from Shattuck Clearing toward the fire in an effort to speed up supplies; that men with chain saws and axes were building a line around the fire, and that pumping operations were continuing. He also reported that six horses were being used to carry in food and supplies, and that additional supplies, including hose, were being air-dropped from the Department's Gruman Amphibian, the Goose. In addition, he reported the first casualty among the fire fighting force; this man, not seriously hurt, was taken at once to Shattuck Clearing where Dr. Johnson of Long Lake (who had volunteered his services) took care of him.

With the fire line virtually complete, and plenty of help and equipment available, the situation appeared to be well in hand as of Monday night, although 1,000 feet of hose had been destroyed by a sudden shift of the fire.

Tuesday

Early Tuesday morning, the Cold River fire was reported as quiet, but still burning deep. The second fire, reported by Pilot McLane on the previous day, was also reported under control, although a light portable pump and sufficient one-inch hose had been dispatched to the scene as a precaution. Patrols were established.

July 27th

As of this writing, the Cold River fire is still being patrolled. It has burned very deeply into the ground. On damp days it appears to be dead, but after a few hours of sunshine and low humidity the smoke starts again. It may be another two or three weeks, or possibly longer, before this fire can be considered out. Meanwhile, a combination of drought, high winds and low humidities could make it a starting point for other fires.

Conclusion

We were lucky on this fire. We were lucky (1) that we got the rain when and where we did; (2) that the wind was moderate when the fire was at its peak (a high wind might well have made the fire completely uncontrollable); (3) that the fire occurred near the river, where plenty of water was available, and (4), that we had men in charge of the fire who were alert to take advantage of every break.

But there were other factors which played an important, even vital part. If the truck trail into Shattuck Clearing (built last year by the Department), had not been available to get the men into the fire, in the opinion of Superintendent Hyde, "We might just as well have sent our fire fighters to the movies; we could never have gotten them in there in time."

A second factor, perhaps even more important, was the immediate availability of equipment and experienced personnel. A "campaign fire" involves the co-ordination of three distinct agencies: (1) the line organization which does the actual fire fighting, (2) a logistics organization to handle supplies, etc., and (3) an office force to do map making and the necessary record keeping. On this particular fire, the line organization that did the actual fire fighting was superb.

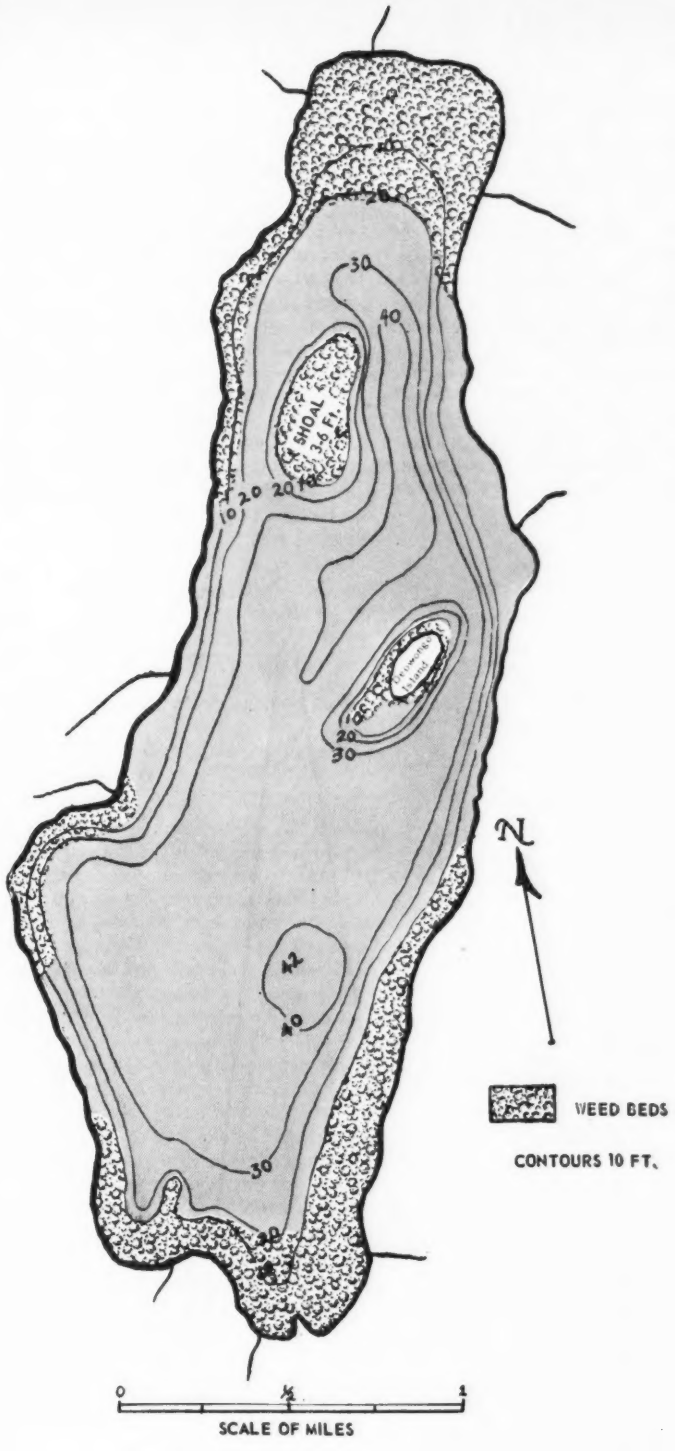
Fortunately, there were two salvage projects operating in the area—Projects E 22 and E 23, the former operated by the Towsley Lumber Company and the latter by the Turnquist Lumber Company. Both of these projects closed down completely at the first word of the fire, and all equipment and personnel were offered promptly to Fire Boss Bill Petty. Towsley made all the facilities of his camp available. In addition, Finch, Pruyn and Company closed down several jobs currently operating on its own property in nearby areas, and dispatched lumberjacks with chain saws to help fight the fire. International Paper Company did the same. The Eaton Sawmill on Route 28N closed down and sent men and equipment; so did Bill Ward's mill in the same area. The National Lead Company at Tahawas, through Messrs. Allen and Axtell, were extremely helpful in recruiting men and getting them to the fire. Supervisors Donnelly of Minerva and Rist of Newcomb did great work in canvassing their townships and recruiting experienced men, and the U. S. Shuttle and Bobbin Company dispatched some much needed heavy equipment. Coming from Huntington Forest, near Newcomb, Ralph Hutchinson and his men were among the first to get into the fight on Saturday. There were others, many others.

It should be noted that by law, the Conservation Department is in a position to pay fire fighters only 75¢ per hour. Virtually all of the experienced help used on this fire was recruited from jobs that pay three or four times that much. In most cases, the companies mentioned above make up the difference to the men out of the company's own funds. In all, Bill Petty had 500 men available.

LONG range planning really paid off in getting the Cold River fire under control; once the fire had been spotted there was no doubt in any one's mind as to what he was supposed to do. But as we said before, it was the wholehearted co-operation—often involving great sacrifice —of the wood-using industries and the local citizenry which turned the tide.

The nightmare of a big fire in the Cold River country still haunts us. The fuel—all but the 240 acres that burned—is still there. The first test has been passed, but there will probably be another one, and very likely a tougher one.

—P. W. Fosburgh



Canadarago Lake

LOCATION

North central Otsego County.

PHYSICAL FEATURES

Area: 1,958 acres.
Elevation: 1,276 feet.
Maximum Depth: 42 feet.
Length: About 3¾ miles.
Maximum Width: About 1¼ miles.

CHEMICAL CHARACTERISTICS

pH: Alkaline.
Water Temperature: Deep water during summer, 59-61° F.
Dissolved Oxygen: Adequate for most fish life except in deep water during summer.

AQUATIC PLANTS

Very abundant, and especially so at the north and south ends of the lake and on shoal northwest of Deowongo Island. The more abundant plants include: Bullrush, burreed, cattail, yellow water lily, and eel-grass.

FISH

This lake produces a heavy poundage of warm-water fish, with an over-abundance of forage fish.
Yellow perch: Very abundant, but in general growth rate is slow.

Bullheads: Very abundant.
Pike-perch: Currently stocked, but fishermen report few taken.
Golden shiner: Very abundant in weedy areas.
Eel: Fairly abundant.
Chain pickerel: Abundant.
Smallmouth bass: Common, but not readily taken by anglers.
Largemouth bass: Common, but fishermen report relatively few caught.
Common sunfish: Fairly abundant.
Rock bass: Common.
Minnows: Several species present.

—A. C. Petty, *Sr. Aquatic Biologist*

For a more stabilized program of

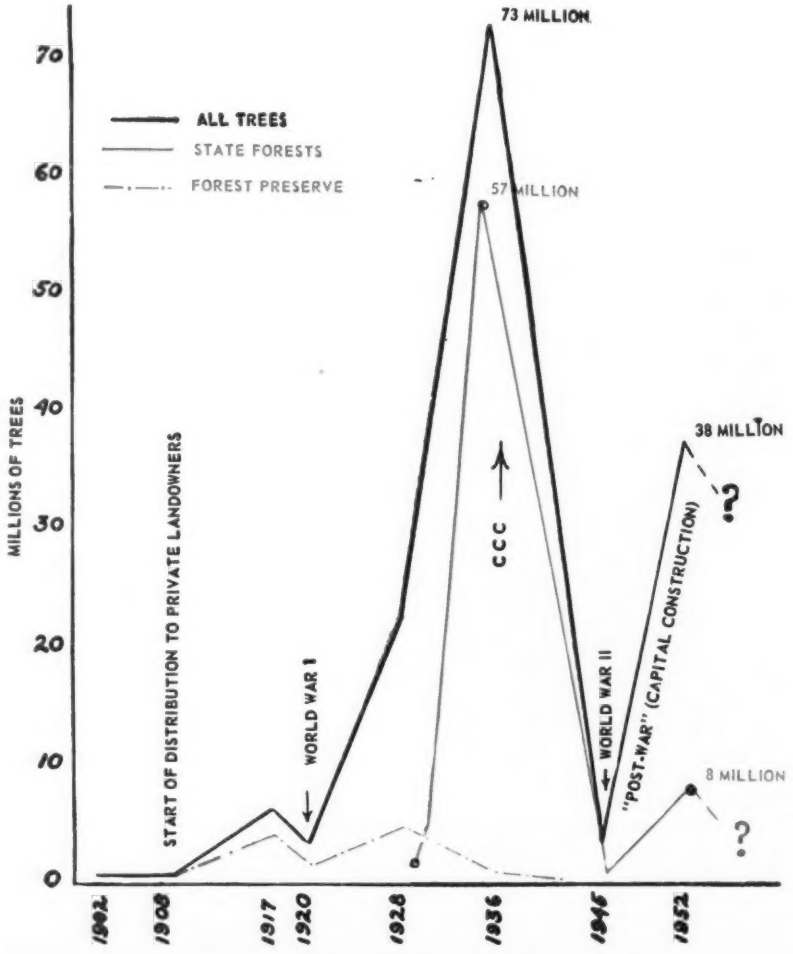
Reforestation in New York

FEW if any of our citizens question the value of reforestation. As a conservation practice, the planting of seedling trees on idle lands —both public and private—has become generally accepted over the past 50 years in New York and other states. In New York State particularly, which has carried on one of the largest programs in the country, reforestation has been widely acclaimed as one of our soundest and most rewarding projects.

In view of these facts, it would be logical to suppose that over the years we had developed here in our State a long-term reforestation program, a program permitting close co-ordination of nursery production and planting plans, a program aimed at a sustained, financially sound *forestry* project.

As a matter of fact, there have been plans and programs, but a glance at the charts which accompany this article will show how difficult it has been to adhere to any of them. Reforestation in New York has been subject to violent and unpredictable "ups and downs" resulting from the impact of various events and influences having little to do with forestry itself, but which have largely determined the extent and direction of our reforestation efforts. In spite of the best thinking and planning of our technical staff, our programs have been interrupted or disrupted by such things as wars and depressions and other factors beyond our control. The result has been that our reforestation program, instead of standing on its own feet, has often been used as a prop to support social or economic projects in which forestry has been strictly a secondary consideration. What we need, and need immediately, is a reforestation program that can be continued over a reasonably long period, and that can be supported on its own merits.

Although almost everybody knows something about reforestation and realizes, in a general way, that it's a good thing, comparatively few are sufficiently informed as to the real meaning and objectives of reforestation, or the problems which are involved in carrying on a large program. Reforestation means a lot more than just planting trees today and waiting 50 or 60 years for sawlogs. It involves problems of seed procurement (often from distant localities), nursery propagation, selection of species to fit various kinds of planting site, protection, cultural operations in young plantations, forest inventory, cutting plans and marketing of the products. These are technical forestry problems; but there is more than forestry in such a program. When we reforest an area we are not only planting a crop—we are profoundly influencing an environment. On the abandoned or submarginal farm lands, ("1/6th of the State") where most of our tree planting is done, the establishment of a forest plantation takes the land irrevocably out of agriculture; the ground becomes shaded over, and the grasses and other herbaceous plants of the open fields are replaced by a mat of needles which commences to develop its own "humus layer"—a phenomenon which has been largely absent from these sites ever since the removal of the primeval forests a century or more ago. The vegetative succession, in turn, affects



Trees distributed for planting 1902-1952 showing high and low points as affected by World Wars I and II, the CCC and post war program. Note the predominance of State Forest planting.

the wild life habitat in an almost revolutionary fashion. The field mice are driven out, and the songbirds come in; upland game birds, rabbits and even deer find in these thickets a welcome cover to protect them from weather and from their enemies. There are physiographic changes, too, in a reforested area: soil erosion and water run-off are retarded; gullying no longer takes place; the snow stays longer in the spring, and in a word, the soil and water economy of the area tends to become stabilized.

In many instances, these environmental effects are a sufficient justification, in themselves, for reforestation, and many plantations have been set out with just these objectives in mind, without thought of ever cutting a fence post or a stick of timber. (It is significant, in this connection, to note that the "Enlarged Reforestation Program" of the 1930's described later in this article was conceived not so much as a forestry program as it was a program of agricultural relief—that is, of retiring submarginal farm lands from agricultural use.) Yet these collateral benefits should not make us forget the basic purpose of reforestation, which is to augment the supply of available wood—one of the first essentials for any civilization, and a commodity of which we as a State are importing more than we raise at home.

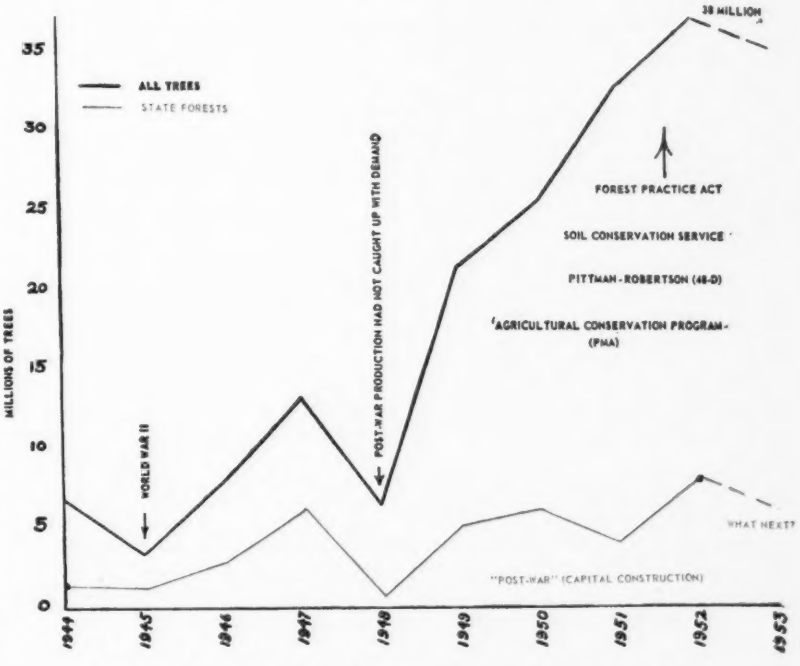
In further appraising our reforestation program, it is necessary to distinguish between planting by private owners and planting on State forests.* The first planting under the State reforestation program was done exclusively on Forest Preserve lands in the Adirondacks and Catskills, mainly for the purpose of rehabilitating areas that had been severely burned over, and the program was nearly a decade old when in 1908, trees were distributed for the first time to private landowners. A fairly even balance was maintained between State and private planting until after World War I, when there developed such a rapid increase in the activity of private owners that the total trees planted by them far outran the number planted on the Forest Preserve.

In 1929 this situation was reversed through the inception of the "Enlarged Reforestation Program" for the acquisition and development of State Forests outside of the Adirondack and Catskill parks, where production forestry might be practiced without encountering the constitutional prohibitions against cutting trees which prevailed in the Forest Preserve. Probably no State conservation program ever got off to a more auspicious beginning. Farmers, sportsmen, agricultural experts, and conservationists all joined hands in developing a plan which was approved by the Legislature, and then by all of the people of the State through the adoption of a special Constitutional Amendment. This amendment set up a reforestation program with a specific goal calling for the planting of a million acres of submarginal land, on a schedule of mandatory appropriations over a 14-year period.

This fine start notwithstanding, the program has had a checkered career during the past 20 years. First, a major depression made it impossible to carry out the financial commitments of the Constitutional Amendment, and it was repealed. Then came an unexpected form of assistance when thousands of CCC boys became available for work in the woods. World War II choked off this program completely. During the present administration, State Forests again became a major project with the expenditure of $7,696,000 (ending this year) from the Postwar Fund, most of which was devoted to catching up on the care of these areas on which a great backlog of work had accumulated during the war years.

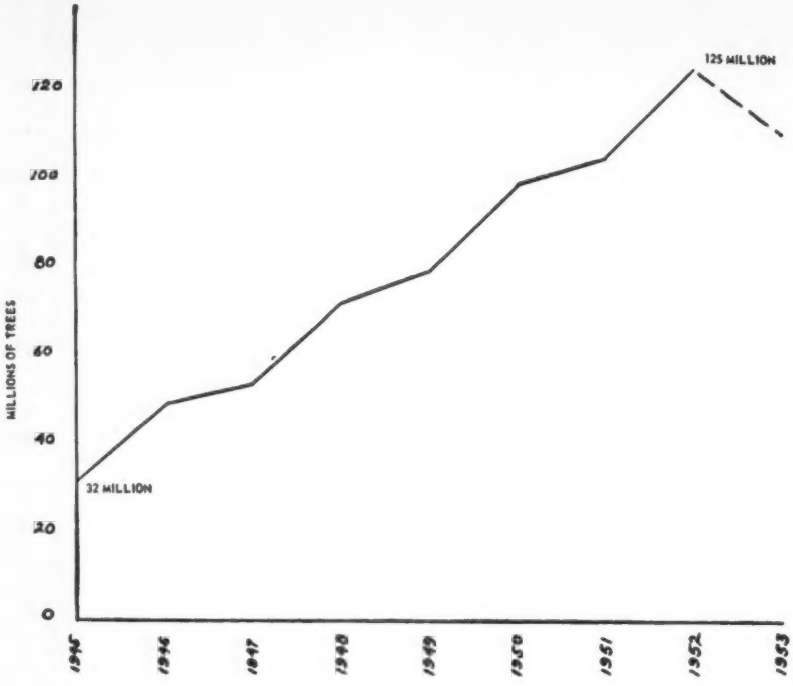
Since 1945, reforestation by private owners has been greatly stimulated by several factors: The deferred demand of the war period when nursery and planting operations had been at a standstill; increased incentives, such as free trees under the Forest Practice Act, ACP payments for tree planting, partial subsidy in the matter of planting service through the Pittman-Robertson program; increased activity of co-operating agencies such as the Soil Conservation Service and the Extension Service in promoting reforestation; and a steady migration of city people to rural properties which they are using for residence purposes (either vacation or all-year), and which they want to plant to trees instead of farming it, as the original owners had done.

During the past year, however, we have witnessed a leveling off in certain types of demand for trees, which we attribute to taking up the slack of deferred planting during the war and to gradual saturation of demand from newly developed sources. In addition, we can foresee a curtailment (some of which is already in effect), in various fields of public assistance. Both New York State and the Federal government are in a phase



Trees distributed for planting by years, 1944-1953 showing effect of various assistance programs in stimulating reforestation by private owners.

* Next issue, an article on State Forests.



Nursery inventory showing build-up from low point in 1945 to all-time high in 1952. Nursery inventory is made up of 1-year, 2-year and 3-year seedlings; only the 2's and 3's are large enough for planting. Inventory of 125 million trees is required, making allowance for losses, to maintain an annual tree distribution of 40 million.

of retrenchment, where all activities (particularly those where any form of subsidy appears to be involved) are undergoing critical scrutiny both from the legislative and executive branches; and it doesn't require any gift of prophecy to predict that reforestation as well as other activities will feel the effects of this trend.

All these fluctuations in the demand for trees places a tremendous strain on our nursery organization. In the first place, it takes three to four years from the time the Conservation Department procures its tree seed to the time the trees are ready to leave the nursery. Or, to put it another way, we are buying seed in the summer of 1953 to produce 2-year seedlings for shipment in April, 1956, or 3-year seedlings in April, 1957. To maintain an annual output of 40 million, or whatever number, we must have about three times that many in the nursery at the time of our fall inventory. Thus, we have to plan several years ahead, and endeavor to gauge the State's public and private needs for nursery stock. To understock our nurseries means an unnecessary slow-down in public and private planting. To overstock beyond public and private needs means that valuable stock must be plowed under if it is not removed from the nurseries on schedule. Owing to war conditions, not an ounce of seed was sown in the State nurseries in 1942 or 1943. Although sowing was resumed in 1944, the Department was handicapped in that year (and also in 1945) by poor seed crops of the native species, while seed from European sources was for the most part still unavailable. Much of the pine seed of those years was "vintage of 1938" from our cold-storage plant at Saratoga.

Thus the postwar nursery program got off to a slow start, but was greatly accelerated from 1947 on, until in 1952 the tree inventory at the two State nurseries at Saratoga and Lowville reached the all-time high of 125 million, pointing toward an output of 40 million a year. At the end of 1952, however, we undertook an intensive re-appraisal of what our future needs would be, and when everything was added up, it appeared that for the next five years or so our annual demand would be, not 40 million, but 30 million or less. Thus, we curtailed substantially the amount of seed sown in the spring of 1953 and will continue on this reduced basis unless some new development, at present unforseen, points the way to another change in production schedules.

Perhaps 1953 is a good time to take stock of our reforestation program and see what can be done, or at least recommended to the people of the State and their representatives in the Legislature, toward developing a plan particularly on the State Forests, that will not depend so largely on emergency programs and funds. What we need is a program that will have sufficient continuity over a long enough period of years so as to enable our corps of professional foresters—second to none in the country, if we do say it—to carry out the sound management practices which they are competent to formulate, and to demonstrate to the public the potential soundness of the *forestry* in reforestation.

—E. W. LITTLEFIELD,
Superintendent, Forest Management

Tree planting

"The limitations imposed by the forestry clause in the State Constitution prevent the undertaking of any forestry work similar to that carried on in European countries and at some places in the United States. The Department is prohibited by law from harvesting the matured or decaying timber on the Preserve. . . . There remains, however, one important branch of silvicultural work which the Commission can undertake with a reasonable prospect of success, and which can be carried on without violating any provision of the Forestry Law. Tree planting can be done; the denuded acres of the preserve can be reforested."

The above passage is quoted from the Report of the New York Forest Fish and Game Commission for 1901. Although Dr. Fernow's experiments in reforestation had been started at Axton three years earlier, this is the first suggestion by a State official that the State agency itself should embark on an extensive program of reforestation, and it thus represents the germ of an idea which in half a century has grown into one of the world's biggest tree-planting projects. As indicated above, the question now is: Where do we go from here?

Fisheries research in

New York Farm Ponds

IN the space of a few years, farm pond construction in New York has become a well recognized and rapidly expanding conservation practice. A large percentage of these ponds have been built with assistance from the U. S. Soil Conservation Service, and statistics recently made available by the S.C.S. reveal that the number of ponds constructed in New York State has increased from 1,900 in 1950 to 3,254 ponds completed as of January 1, 1952. And these figures do not include ponds constructed without S.C.S. assistance. Clearly, farm ponds are here to stay.

As described in an earlier issue of THE CONSERVATIONIST (Oct.-Nov., 1948), the farm pond can serve a variety of purposes, one of which may be to provide fish for the owner. From the steadily mounting clamor for information on the stocking and management of fish in New York farm ponds, it is apparent that for the majority of owners fish-rearing ranks high on the list of desirable pond uses. For ponds in the southeastern United States, biologists have determined species combinations, stocking rates, and fertilization and harvesting practices which will usually produce satisfactory yields of fish, but until recently, recommendations designed specifically for the management of fish in *northern* ponds were non-existent. It was this dearth of information which led to the initiation of a long-term fisheries research program in our farm ponds.

Investigations of New York's farm fish ponds originated in 1949 in the form of graduate studies conducted by two students at Cornell University. Since April, 1952, this research program has been handled by Cornell University on a contract basis for the State Conservation Department, under the terms of the Dingell-Johnson Act which provides Federal aid in state fisheries research programs. The overall aim of the project is to determine management methods by means of which maximum crops of fish can be economically produced on a sustained yield basis.

Current investigations are concerned with three categories of ponds: Trout ponds, ponds stocked with warm-water species such as largemouth bass and bluegill sunfish, and ponds used for the production of bait minnows. At present a total of about 120 ponds in various areas of the State are under investigation. Most of these are privately owned, and research is carried out on the basis of a co-operative agreement between the pond owner and the Farm Pond Research Unit at Cornell. Due to limitations of funds and personnel, the unit's investigations are necessarily restricted to those ponds which are needed directly for research purposes.

Much of the experimental work on farm fish ponds is inevitably a process of trial and error. For example, to determine the optimum stocking rate for trout, groups of ponds are stocked at different rates. Then at intervals thereafter the research crew visits these ponds to evaluate the results which have been obtained in each case. Data accumulated over a considerable period of time on a large number of ponds may be expected to provide information which is applicable to the average New York pond (if such a thing exists). Species combinations, fertilization practices, and other management measures are tested in a similar manner. The success of such techniques is measured in terms of the number and total weight of fish produced, their growth rate, and, in the case of ponds stocked with a combination of species, the extent to which a suitable numerical balance between the various species is maintained.

In most cases a large sample of the fish population of a pond can be obtained by seining. As described in the accompanying illustrations, reliable population estimates can often be obtained from two successive seine hauls. Data on the lengths and weights of the fish thus collected provide information on their growth, and a good guess concerning the total poundage of fish present may be obtained by multiplying the total estimated population by the average weight of the individual fish present. In some instances ponds are drained, and on such occasions, of course, a complete enumeration of the fish population can be made.

Like all thumbnail sketches, the preceding description is over-simplified. The exact techniques employed in evaluating fish pond management procedures are often more complex than indicated above, and vary considerably with pond conditions and with the kind of fish under consideration.

What has been learned from these investigations to date? With regard to trout ponds, a fairly respectable amount of information has already been accumulated. In a total of 30 farm ponds stocked with fingerling trout during the past four years, the average annual survival has been about 65 per cent during the first two years following stocking. After reaching an age of two years, farm pond trout begin to die off at a more rapid rate, and there is some evidence that this increased mortality may be associated with the attainment of sexual maturity. In this connection experiments are now being conducted to evaluate the survival of hybrid trout, such as crosses between brook trout and rainbows or browns; it is possible that such hybrids may fail to reach maturity until late in life, if at all.

Although ponds with a permanent supply of spring water are ideal for trout, a number of New York ponds fed exclusively by surface runoff have been found to support good populations of trout throughout the year. Survival is best in runoff ponds situated at higher altitudes, and in those having a maximum depth of at least eight feet, with depths of six feet or more prevailing over at least one-third of the total pond area.

Trout stocked at the rate of 400 spring fingerlings or 300 fall fingerlings per surface acre of water ordinarily attain a length of seven inches or larger by spring of the year following stocking, and reach 13 to 15 inches in the third year of life. Toward the end of the first summer after stocking, a typical one-acre New York trout pond can be expected to contain from 90 to 120 pounds of fish. The pond itself furnishes all the food required to produce these results. Supplementary feeding is fun, but unnecessary. But a newly-constructed pond should be given a four- to six-month grace period after filling before fish are stocked for the first time—a period in which a supply of nutrients and aquatic food organisms can become established.

With a few notable exceptions, trout do not reproduce in New York farm ponds. Therefore in order to keep your pond well supplied with catchable-sized trout, it is necessary to restock every two or three years. For re-stocking purposes fall fingerlings (usually about six inches long) are a better bet than the younger and smaller spring fingerlings, for the reason that they are less likely to be devoured by the large fish remaining from the previous planting.

While on the subject of stocking, one other point should be stressed: If you want trout, stock trout, *and nothing else.*

(*Continued on next page*)

1. A half-acre brook trout pond is swept with a bag seine 150 feet long.

2. As the net is drawn ashore near the spring inlet . . .

3. . . . the fish are concentrated in the bag located in the center of the seine.

4. Trout are measured . . .

5. . . . weighed . . .

6. . . . and temporarily marked by clipping a corner of the tail fin. All fish are then released, and a short time later the pond is seined again. From the total number of trout and percentage of marked fish recovered in this second haul, the pond's trout population can be reliably estimated.

One of the most common causes of eventual trout pond failure is the introduction of other fish species such as sunfish or bullheads. Such practices are fine if you want a sunfish or bullhead pond.

Many New York farm ponds have prevailing summer water temperatures which are usually too high to make them habitable for trout. Such waters may be stocked with one or a combination of warm-water fish species. To date, most of these ponds have been planted with largemouth bass and bluegill sunfish at the rate of 100 bass to 1,000 bluegills per surface acre—the standard recommendation for ponds in the southeastern states. Because of difficulties in obtaining reliable population estimates in bass-bluegill ponds, and also because in most New York ponds conventional fertilization and cropping recommendations are not followed, it is impossible to state definitely that the southeastern system of warm-water pond management is not applicable to New York conditions. There are, however, strong indications that this may be the case. In New York ponds investigated thus far, there is a pronounced tendency for the bluegills to become overabundant during the third or fourth year after stocking, resulting a large and stunted bluegill population and much reduced bass reproduction.

Several factors contribute to this tendency for the bluegills to get out of hand. One of these is that in New York ponds the growing season is shorter than in the Southeast, with the result that although the bluegills spawn during the first year after stocking, the bass do not reproduce until the second summer following that in which they were planted. Thus the bluegills are off to a decided head start from the beginning. The bluegills' lead is further increased by the fact that many New York pond owners have little inclination to fish out the large bluegills, which in southern states are a more highly esteemed pan fish. As in the case of trout ponds, the introduction of contaminating species may further limit production in ponds stocked with bass and bluegills.

At the present time, research is in progress to determine means of maintaining better balance between the bass and bluegills in New York ponds. Bass-bluegill stocking ratios of 1 to 1 and 1 to 5 are being tested in several ponds. An alternative solution now under investigation is to stock bass and bluegill at the conventional 1 to 10 ratio, but to plant the bass one year earlier than the bluegills, so that both species will spawn for the first time in the same season. Still another alternative is to substitute some other less productive prey species in place of the bluegill. On the other hand, perhaps we can help the bass keep the bluegills in check by adding a few of those tried and true cannibals, chain pickerel. All of these techniques are now being tested, but it will be several years before we begin to obtain reliable information on their practicability.

From the preceding remarks it is evident that ponds stocked with more than one species of fish involve a lot of biological complications. An alternative approach is to plant warm-water ponds with some single species which can succeed alone. Following this line of reasoning, several ponds have recently been stocked with fingerlings of the channel catfish, a large and highly edible cousin of the common bullhead. Additional trials of this species will be initiated in the near future.

Until now we have discussed farm ponds used for the production of game and/or food fish. Last but not least should be mentioned those farm ponds employed for the production of bait minnows. A strong demand, coupled with high prices and a trend toward increasing restrictions on the seining of minnows from natural waters, hold promise for the propagation of bait minnows in warm-water ponds of New York State. Whether or not minnow culture can be economically successful here depends upon the production which can be obtained in New York ponds. Providing an answer to this question is the fundamental objective of the third and most recent phase of the farm pond research program.

In order to learn as much as possible about the supply and demand aspects of the minnow situation, a survey of bait minnow dealers throughout the State is being conducted. Experiments have been initiated in some 25 ponds to evaluate the suitability of six native bait minnow species for pond culture in New York. In addition to evaluating minnow species, these experiments are designed to test different stocking rates, fertilization techniques, and the feasibility of supplementary feeding. At present there is a need of more ponds for experimental work on a co-operative basis with private owners, and as yet no recommendations designed specifically for the management of minnow ponds in New York are available.

Biological research is a time-consuming business, but the results may be worth waiting for. Should pond propagation of bait minnows in New York prove to be commercially feasible, another use for our farm ponds can be added to the already impressive list.

—Alfred W. Eipper, *Research Associate*

Dollars for f

WE published in the June-July, 1948, issue of THE CONSERVATIONIST, and in the two issues immediately following, Commissioner Duryea's plans for the improvement of hunting and fishing and for the financing of this program. The expanded program undertaken reflects not only the thinking of the Department's experts but of the New York State Conservation Council, the Farm Bureau Federation and other groups and individuals having special knowledge in the fields of conservation.

The foundation for the enlarged program was laid by the Legislature at its 1948 session. In that year, upon the recommendation of the Department, legislation was enacted increasing the fees to be charged for hunting, trapping and fishing licenses by an amount approximately sufficient to provide enough additional revenue to defray the cost of carrying the enlarged program and of compensating for the rising spiral of inflation. The legislation took effect January 1, 1949 and continued in force until December 31, 1951. Re-enacted for another three-year period, it will expire December 31, 1954, and its continuance after this date will come up for consideration at the 1954 session. The Department will then recommend to the Legislature that the existing license fee schedule be adopted for an indefinite period.

To guide it in its deliberations the Legislature will—and very properly, too—expect to receive a complete report covering the Department's fish and game program during the past six years. The following is such a report, necessarily abbreviated because of lack of space.

In the fiscal year April 1-March 31, 1947 (the year immediately preceding the inauguration of our enlarged program) appropriations from the Conservation Fund to the Division of Fish and Game amounted to $2,699,325, as against $4,542,948 in the fiscal year of 1953-54. (The larger part, or about 84 per cent of this figure, comes from the sale of licenses and from fines and penalties; the balance comes from annual contributions to the fund from Federal P-R and D-J programs.) While these figures afford a comparison of the financial aspect of the program, they fall considerably short of outlining exactly what has been accomplished in each field of the Division's activities. Perhaps this story best can be told by comparing fish, game, and law enforcement activities in 1947-48 with accomplishments in the same fields during the past six years.

FISH

To begin with the Bureau of Fish: A comparison of our present program with that of 1947-48 shows clearly the expansion that the increased license fees has made possible. The comparison is even more marked when it is remembered that without the increased fees it would not have been possible to maintain the Department's fish and game program, even at the 1947 level because of the upward spiral of inflation. And it might be added that this is equally true in all our fields of operation.

More fish for stocking

In 1947 our hatcheries produced 238,471 pounds of fish; in 1952, 487,893 pounds, an increase of 105 per cent. This increase represents not only more fish, but larger fish. For example, 2,056,452 trout one year or older were produced in 1952 as compared with 934,953 in 1947. This increased production has been obtained by the construction of two new hatcheries (one at Chautauqua for muskalonge, the other at De Bruce for trout) and by large scale expansion and improvement of the rearing facilities at the other 20 hatcheries.

An outstanding development in fish production, made possible through increased appropriations, was the installation of new facilities at hatcheries to provide artificial control of the light cycle in ponds where brood stock is maintained. This resulted in an increased production of legal size brown trout (7" or larger) to 1,053,335, as compared to 234,261 in the previous year—an increase of 350 per cent.

The Department has earmarked $705,089 for its fish production in the 1953-54 fiscal year. This compares with $385,302 in 1947-48.

Fishing rights acquired

Since 1947, fishing rights have been acquired on 178 additional miles of our best trout streams. This brings the total such mileage acquired to date to 770 miles on 55 streams. The Department has allocated $75,000 in the current fiscal year for the acquiring of additional mileage. On the basis of the average cost of purchase per mile to date, about 75 additional miles of rights should be procured this year.

Stream improvement

The task of the Department in providing reasonably good fishing on a stream does not end with the purchase of fishing rights and the stocking of it. There is still the job of improving and maintaining it in good condition. This is accomplished by controlling erosion, decreasing silting, and providing shade and shelter. Under existing law, this kind of work may be done only on State-owned waters or on the parts of streams to which the State has title to fishing rights. The appropriation for this work in 1947-48 was $50,000. In 1953-54, the Legislature appropriated $200,000 for stream improvement. This will permit major improvement work on 25 streams and the stockpiling of logs and lumber for work in succeeding years.

Fish salvage

An important function of the Division is the salvage of fish and the control of undesirable fish. This work consists of controlling undesirable species, the removal of fish from reservoirs and waters closed to fishing for release in waters open to public fishing, and other similar specialized work in connection with the management of local waters. In 1947-48 two crews salvaged and restocked 198,713 fish weighing 112,635 pounds. Five crews, netting 50 waters in 28 counties in 1952, took 986,053 fish weighing 243,346 pounds, and restocked them in 203 different bodies of water in 14 counties. On the basis of reported progress to date, an even greater poundage will be netted and transferred in 1953. For the work in this year $77,798 has been earmarked, as against $24,855 allocated in 1947-48.

Pollution control work

A two-man unit, consisting of a biologist and a chemist, carried on pollution control work in 1947. This work has been expanded by the establishment of another two-man unit located at Rome to work with the Water Pollution Control Board on the classification of waters and the determination of water quality standards. To supervise and supplement the

fish and game

work of the two units a Senior Aquatic Biologist has been added to the staff. And during the summer months (the critical period from a pollution standpoint) two chemists are temporarily employed.

Dingell-Johnson program

For the first time, beginning July 1, 1951, the Federal government made money available to the Department for aid in carrying out our fisheries program. Under this arrangement, known as the Dingell-Johnson program, the government pays three-fourths of any fish project approved by it prior to its undertaking by the Department. At present eight projects are in progress. This year $28,089 was appropriated to pay the State's share of the $112,357 program.

Better management of waters

A fundamental principle of fish management is that each water must be managed individually in order to secure the greatest production of fish. Dealing with this problem is one of the most important functions of the District Fish Managers and their assistants. In 1947 the Department had three district fish management offices located at Rochester, Poughkeepsie, and Saranac Lake. With the opening of offices at Norwich and Watertown, the number has been increased to five. And in order to fill a demonstrated need, it is planned to increase this number to nine. This will result in greater efficiency in services to the public and in operation, because it will be possible to combine for administrative purposes the fish districts with the game management districts and the proposed law enforcement districts. In the current fiscal year, $152,741 was allocated for the work of the fish management districts. This compares with $70,555 appropriated in 1947.

Research

In the past research work in fish has been centered primarily in the fish management districts. It would be a big mistake to underestimate the importance of fish research. The fruits of sound research—new knowledge and new techniques and new tools—provide the only basis for the development of better management methods.

One of the impressive results of the research the increased moneys made possible has been the establishment of good salmon fishing in Schroon Lake and Lake George. This project is being expanded through experimental plantings of salmon in other waters.

Another outstanding example of the results of research carried on with the new moneys is the development of trout pond restoration—once an experimental measure, now an accepted management technique. This work consists of restoring waters to production of trout through elimination of undesirable fish by use of chemicals and restocking with trout. In the three years the work has been carried on, good to excellent trout fishing has been restored in 23 bodies of water in which there was little or no trout fishing before. Increased funds have made possible this expansion; in 1947, $43,558 was allocated for research as compared with $103,532 in 1953.

The program for fish for 1953-54 will cost $1,491,552. This represents an increase of 192 per cent over the amount spent in fish work in 1947-48. While no inconsiderable amount of this increase is due to inflation, the significant thing to note is the greater production and the larger fisheries program which has been developed in the past six years.

GAME

The story for game about parallels that for fish: It has been one of uninterrupted expansion during the past six years.

Improved game habitat

One of the more important aspects of game management developed in recent years has been the practice of improving food and cover for game on private lands. Prior to 1948 this kind of work was carried on in a limited way only on State-owned lands. An indication of the way this development work has been expanded may be seen in a comparison of the year 1948 with the current fiscal year: In 1948, $92,970 was allocated for the work; in the 1953-54 fiscal year, $516,358. The objective of this work is to increase the carrying capacity of the lands by providing additional food in the form of food bearing shrubs, and cover in the form of coniferous plantings. Food and cover are also provided by fencing against livestock those areas on farms which cannot be used for agriculture but can be made to produce a game crop when properly developed and protected.

Between 1948 and 1953 30,289,494 coniferous trees were planted in small blocks. These were planted on 5,653 farms. From these plantings not only are direct economic benefits accruing to the co-operating farms, but cover for deer, grouse and varying hares is being established.

Shrub planting

A total of 8,942,829 food bearing shrubs was planted as field borders on 5,160 farms, usually in conjunction with coniferous plantings. These are providing protecting travel lanes for farm game, and also provide sources of winter food supply. To produce and supply these shrubs the Department established a nursery at Painted Post, Steuben County.

Woodlot fencing

Wildlife areas in the amount of 37,009 acres were developed by fencing planted shrubs and conifers on 1,259 farms. Damage from woodlot grazing is thus prevented, and the understory plants contributing to food and cover of upland game are allowed to develop.

Small marshes

In 1949 it was realized that small marsh units on private lands could be especially productive of waterfowl and aquatic furbearers; also that the margins of such units were especially adapted to natural feeding and protection of most upland game species. These units are from three to five acres in size. Since 1949, 286 small marshes have been established on separate farms throughout the State. In addition, 38 marshes have been developed on State-owned game management areas.

Improved services on game management districts

Prior to 1948 there were eight Game Management Districts, each headed up by a technically trained District Game Manager with a small force of laborers, trappers and caretakers, to provide advice and assist sportsmen and landowner co-operators in productive measures for increasing the game supply. One additional district—Ontario-St. Lawrence—

has been set up and staffed to handle more adequately the vast Adirondack area. Included in the activities of the districts is the necessary work for estimating game populations for the setting of seasons and bag limits, the distribution of artificially propagated stock, the trapping and transfer of wildlife to establish and re-establish populations, the trapping and transfer of nuisance beaver, the trapping of excess fox populations, and the development of the State-owned game management areas. The budget for handling the activities of the districts in 1953-54 fiscal year is $209,690, as against $149,535 in 1947-48.

Added holdings in game areas

Added to the Department's holdings of 82,800 acres of land managed game areas, 5,464 acres have been acquired by purchase since 1947 and 1,332 by long-term lease. The areas now held in fee or by lease for game management purposes amount to 89,496 acres in all.

Improvement of game management areas

Since 1947, $234,000 has been expended in making permanent improvements on 21,000 acres of these lands. Improvements included impoundments for waterfowl at Oak Orchard and Vischer's Ferry management areas. Upland developments in the form of changing unproductive brush lands to improved game lands have been accomplished at the Perch River, Three Rivers, Oak Orchard and Vischer's Ferry areas. On the Capital District and DeBar Mountain areas substantial clean-up work was done to prevent fires and to make the area accessible to hunters following the 1950 hurricane. This clean-up work is of substantial benefit to game, and provided considerable logs and lumber for game management work.

Solving game management problems

The game research unit is our most important fact finding group, the business of which is to provide answers to the many questions which continually arise on how we may improve management of game. The program of management described above (even that of land acquisition), is guided by what has been learned of the life history and requirements of our game animals. The research program, with considerable modification to cope with new problems concerning the wild turkey, Hungarian partridge, waterfowl production, evaluations of the habitat improvement program and management of small marshes, is to be continued.

Some examples of accomplishment in research follow: The waterfowl population of the entire State has been surveyed and evaluated, and the results are being used in planning our wetlands development; since 1947, 20,000 ducks have been banded and the returns plotted to learn their movements; thousands of deer from all over the State have yielded facts at checking stations which are of greatest importance in planning revisions on our deer management methods; an extensive study of fox-pheasant relations has been completed on the Yates-Seneca counties study area; tests on spring liberations of pheasant breeders and observations on annual turnover of wild populations have yielded data on which can be formulated more profitable management measures for this important game species; experimental trapping and transplanting studies on varying hares have led to the current management practice of successfully trapping and transferring hares to unoccupied ranges, thus supplying snowshoe rabbit hunting in localities which have not known the sport in decades.

The sum of $96,221.24 was allocated for research in 1947 as against $152,998.96 earmarked in 1953—a very small percentage of the sum total spent on game, in view of the benefits derived.

Game farms

Moneys allocated for the operation of the game farms in 1946-47 amounted to $306,165. From a production of 71,500 pheasants in that year the level was raised within two years to over 100,000. In the same period day-old pheasant chick production was increased from 72,000 to 100,000, and quail production from 1,400 to 3,700 birds. In 1948-49 the game farm program was costing the Department $571,000. The increase in production was effected in an effort to assist in the recovery of pheasants following the unprecedented shortage. The height of production was reached in 1948-49, and as the pheasant population gradually recovered from year to year, the amount spent on the operation of the farms has been reduced and the moneys thus saved diverted into game management, fish production and law enforcement. The game farms in 1953-54 are operating on a budget of $307,253, a decrease of $263,747 from the budget of 1948-49, or 46 per cent. Nevertheless, anticipated production of pheasants in 1953 will about equal that of the year 1948-49, and the production of quail will be increased to about 5,000.

Turkey and waterfowl production

Wild turkeys are now being produced on the Sherburne Game Farm for experimental liberation in counties bordering on Pennsylvania where there is potential wild turkey habitat. By these liberations the Department is hopeful that the turkey can be re-established in our own State in substantial numbers.

Another experiment undertaken in the past two years has been with the propagation of ducks—pintails, gadwalls, redheads, canvasbacks and shovelers—which are not presently breeding in New York in appreciable numbers. This program is linked to our small marsh development program described earlier. In combining waterfowl production and wetlands development, there is excellent promise of establishing these species of ducks through the release of breeders on the small marshes.

Increased efficiency

The effect of the streamlining of activities on the game farms is clearly reflected in a comparison of the budget of 1946 with that of the current fiscal year. In '46 the farms operated on a budget of $306,165. In the 1948-49 fiscal year it was $571,000. The budget for 1953-54 is $307,253. In 1946 it required 722 man-months with a 9-hour day to produce the stock which in the 1953-54 fiscal year will take only 455 man-months with an 8-hour day. Meanwhile, the cost of labor has increased $102 per month per man.

LAW ENFORCEMENT

To protect and safeguard more adequately the wildlife of the State and to prevent its being wasted through extravagance, carelessness and ignorance, the Department appointed 20 additional Game Protectors. This raised the strength of the game protective force to 180 regular Game Protectors, 11 District Game Protectors and 22 Assistant District Game Protectors. The appointment of these new men made possible a material reduction in the area assigned to each man to patrol, resulting generally in a considerably more intensive policing. And contributing greatly in this respect was the increase from $75 to $120 a month in travel expense allowed each Protector. District Game Protectors and Assistant District Game Protectors were also given increased monthly allowances for travel.

For use in law enforcement work on our larger bodies of water, our fleet of boats has been augmented by the pur-

chase of 10 new boats propelled by inboard motors. Thirty-three boats propelled by outboard motors have been acquired and assigned for patrol on our smaller lakes and streams; and 44 outboard motors were purchased for the replacement of old motors and for equipment of boats formerly propelled by oars.

The initial step in the equipping of the protective force with two-way short wave radio communication has been taken. To date Handie Talkie portable radio sets have been purchased in numbers sufficient to permit placing a few sets in each law enforcement district.

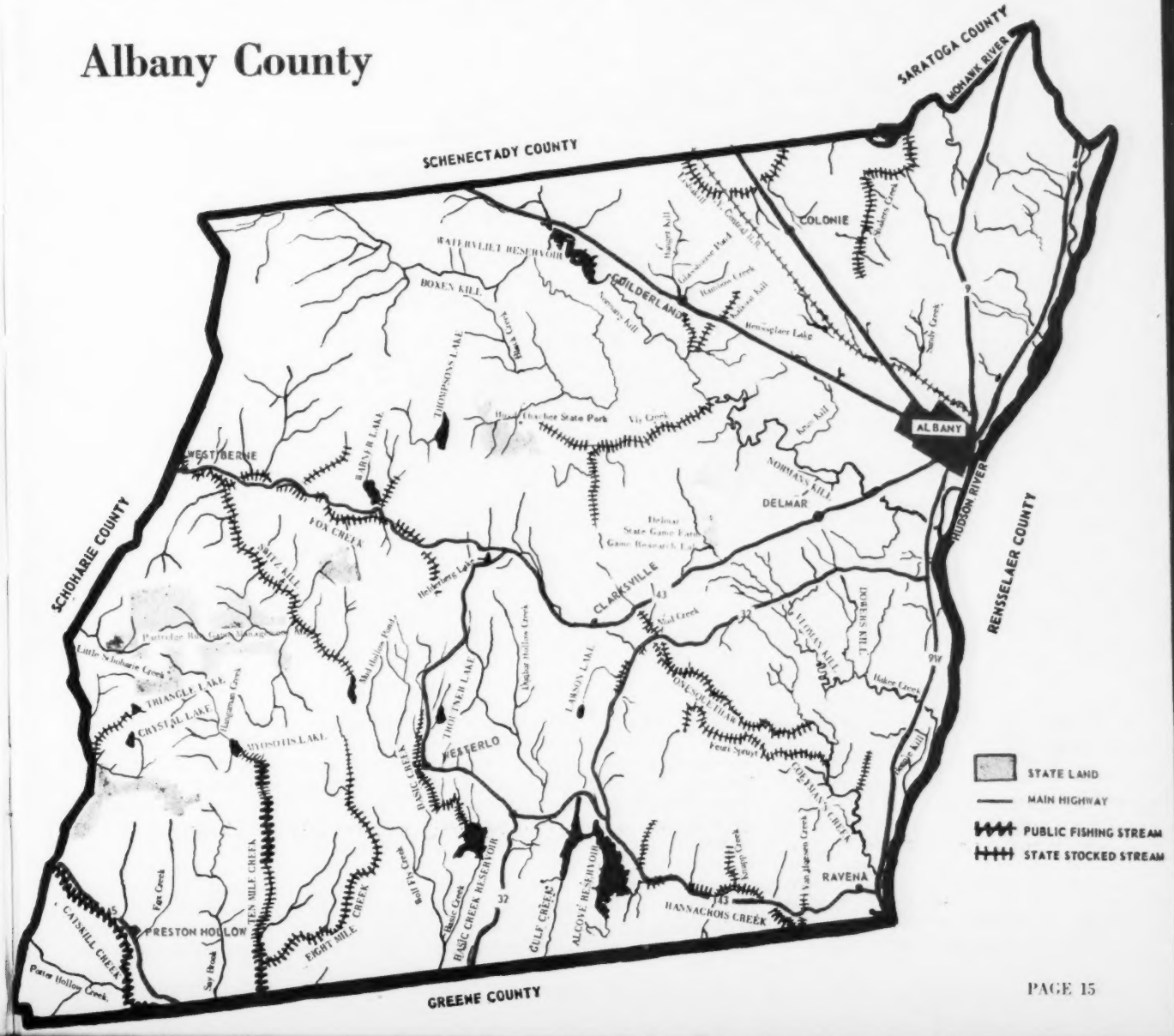
A clearer picture of the expansion that has taken place in the Bureau of Law Enforcement may be seen in a comparison of the cost of operation in the fiscal year 1947-48 with that of the current fiscal period. In 1947, the personal services item amounted to $378,693, as against $648,024 in 1953-54—an increase of 80.6 per cent. Maintenance and operation in 1947-48 amounted to $191,079; in 1953-54, $379,416, of which amount $304,220 is earmarked for traveling expenses of the Game Protectors. In the past six years moneys earmarked for traveling expenses in the Bureau of Law Enforcement have been increased 86.6 per cent. Coincidentally, the overall increase in the cost of operating this Bureau in the last six years is 86.6 per cent.

An additional activity involving our Game Protectors—the training of new hunters—is reported in detail in this issue. As with all the others, this project costs money.

THE above presents in brief the progress made under the enlarged fish and game program outlined by the Commissioner in 1948. That so much has been accomplished can be attributed largely to increased appropriations arising from the temporarily revised license fee schedule. If the present license fees were not perpetuated and a return were made to the old fee schedule, not only would the gains made during the past six years be nullified, but obviously activities of the Division of Fish and Game would have to be reduced below the level of 1947 because of the greatly decreased purchasing power of the present license dollar.

—JUSTIN T. MAHONEY,
Director, Division of Fish & Game

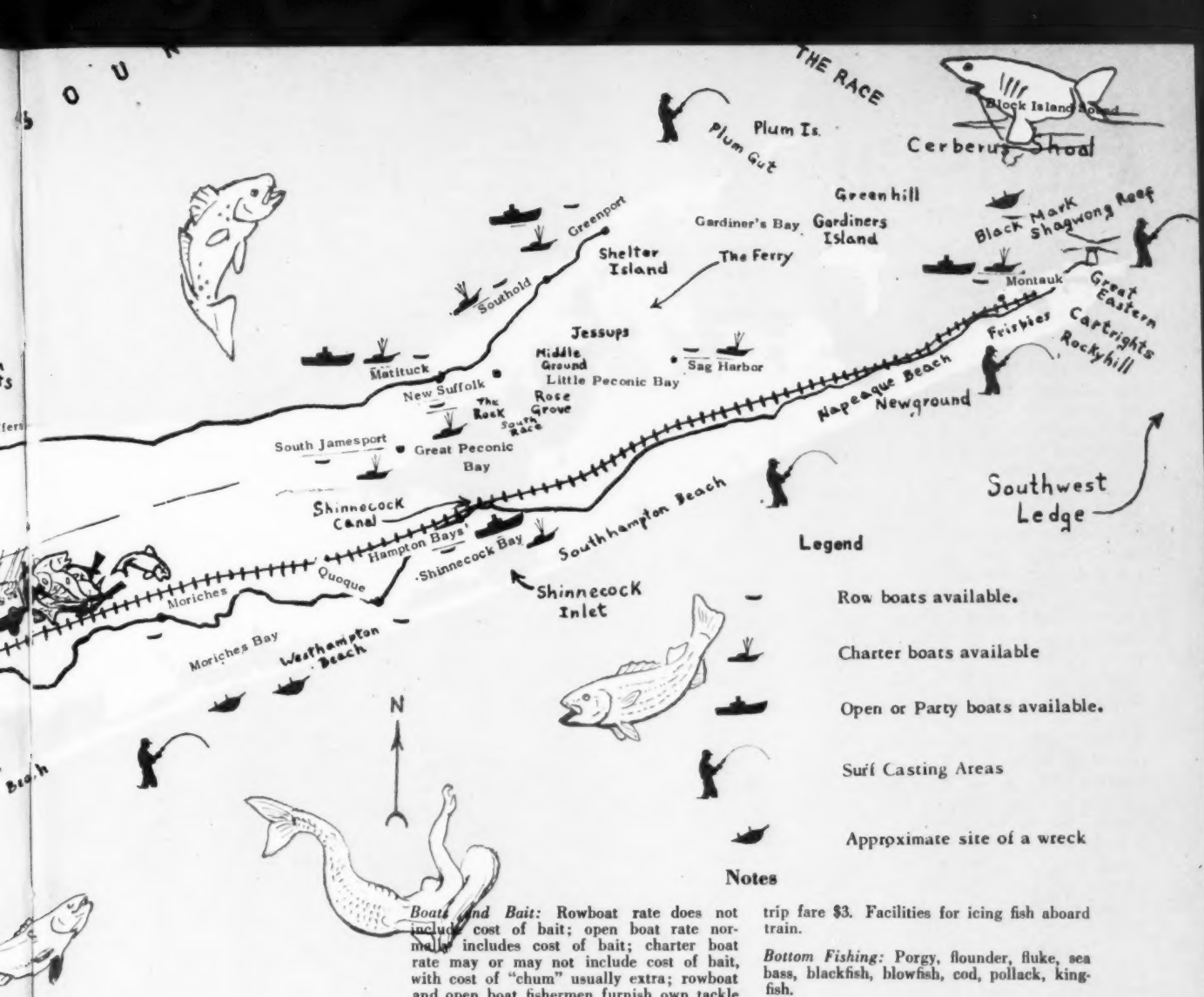
Albany County



Long Island
its fish and fishing

ALONG the Atlantic Coast between Cape Hatteras in North Carolina and Cape Cod in Massachusetts lies an outward sloping submerged plain ranging from wave washed shallows along the beaches to depths of around 100 fathoms some 100 miles off shore. About mid-way in this submerged plain (or Continental Shelf, as it is more properly called) Long Island projects its pebbly beaches, sandy shores, truck gardens, potato farms, express highways and railroads approximately 130 miles into the fish infested waters off the Middle Atlantic Coast. So oriented, no place along the coast is more strategically located to intercept, along its 600 mile shoreline, the hordes of marine fishes which annually swarm across the Continental Shelf.

The movement of these fish is largely controlled, according to species, by seasonal temperature changes. As the cold winter weather begins to give way to warmer temperatures in the spring the weakfish, bluefish, porgies, mackerel, sea bass, fluke, kingfish and other species of the summer clan begin to move into Long Island waters from their offshore and southern wintering grounds. Concurrently, cold water species like the winter flounders, the pollack and the cod fish which have spent the winter and early spring months in Long Island bays, sounds and inshore ocean waters begin to move into the cooler waters off



Notes

Boats and Bait: Rowboat rate does not include cost of bait; open boat rate normally includes cost of bait; charter boat rate may or may not include cost of bait, with cost of "chum" usually extra; rowboat and open boat fishermen furnish own tackle or rent it; charter boats usually can furnish tackle.

Accommodations: Motels, overnight cabins, tourist houses, hotels, near all major Long Island fishing ports. Hither Hills State Park, Montauk, offers camp and trailer site facilities.

Transportation: Long Island Railroad operates "Fishermen's Special" leaving Penn Station, New York City, 4:57 A.M.; arriving Montauk 8:05 A.M. Stops at Shinnecock Canal (Peconic Bay) enroute. Operates on Daylight Saving Time, during summer. Round trip fare $3. Facilities for icing fish aboard train.

Bottom Fishing: Porgy, flounder, fluke, sea bass, blackfish, blowfish, cod, pollack, kingfish.

Trolling or Chumming: Bluefish, weakfish, striped bass, mackerel, school tuna, bonita, albacore, pollack, white marlin, giant tuna, swordfish.

Surf Fishing: Blackfish, bluefish, striped bass, weakfish, fluke, kingfish.

Seasons: Late winter and spring fishing for flounder, pollack, cod; early summer to late fall fishing for porgy, sea bass, blackfish, fluke, bluefish, weakfish, striped bass, school tuna, bonita, albacore, mackerel, blowfish, white marlin, giant tuna, swordfish, shark, dolphin.

shore or to more northerly coasts.

Superimposed upon this annual cycle or movement of fish into Long Island's waters are longer term trends in the abundance of various species. Bluefish, for example, for many years extremely scarce in our waters, have made a dramatic recovery; sweeping up the coast last year in tremendous schools, they furnished the best fishing for that species the old timers could remember. And striped bass fishermen have enjoyed a number of good seasons in late years. Weakfish, on the other hand, have suffered a sharp decline since 1938 but show encouraging signs of recovery this season. Finally, during individual seasons, there are local movements of fish as they seek out suitable spawning areas, follow concentrations of "bait," are influenced by the tidal ebb and flow or are temporarily driven into deeper off shore waters by storms.

The point is, though, that fish of many species abound in Long Island's salt waters and fishing is good for varying species from very early spring throughout the summer, and into late fall and early winter. Moreover, Long Islanders, who annually play host to some two million fishermen, are well prepared with all types of boats, bait and allied accommodations to give you a cordial welcome and a memorable fishing trip.

—Al. Bromley

Crustacea

ONE of the finest ways of approaching the subject of *Crustacea* is with an appetite. If you don't have one handy (an appetite, that is) it's easy to acquire simply by being confronted with any of several crustacean delicacies—hot boiled lobster served with melted butter, parsley butter or Hollandaise sauce; cold lobster on an iced bed of watercress, served with rémoulade sauce; split, charcoal-broiled lobster, best eaten out-of-doors, with a good supply of hot melted butter handy; shrimp, sautéed with shallots and chopped parsley, served on toasted English muffins; deviled crab or soft shelled crabs sauté.

But the *Crustacea* has meaning for others than the gourméts. To the zoologist it means one of the five classes of animals included in the *Phylum Arthropoda*, which, beside the crustaceans, includes such related creatures as the spiders, the centipedes and the insects. Together, these animals—aquatic and terrestrial in habit—dwarf competition in numbers and species, there being five times as many as in all the rest of the Animal Kingdom put together.

To the commercial fishermen, *Crustacea* means a livelihood for the lobstermen, the shrimpers and the crab fishermen. To the sport fishermen, crustaceans, particularly in their larval and microscopic forms, contribute mightily to the basic plankton food supply that makes all the difference in survival and growth of the bluefish, weakfish, striped bass and other important game and food fishes of the sea. And in our fresh waters, crustaceans, although not nearly so abundant or diverse as their salt-water brethren, fulfill an equally important place in the food chain, myriads of microscopic forms contributing heavily to the plankton food for the fry of bass, trout and other game and pan fish. Crayfish, one of the larger of the fresh water crustaceans, furnish a natural food for many of the larger fresh water fish and is extensively used by fishermen as bait. It has been estimated that over 300 tons of crayfish are taken annually for bait from U. S. waters.

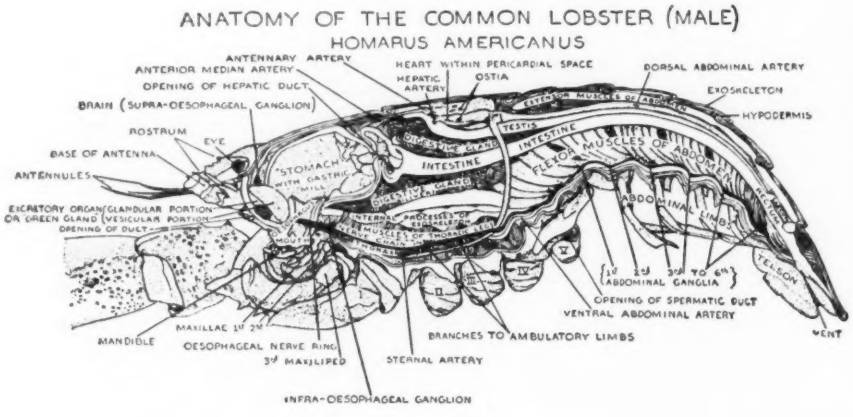
Crustaceans, which serve mankind so well and in so many diverse ways preceded us on this planet by many hundred millions of years. Their calling cards are to be found as fossil remnants in the oldest fossil-bearing rocks. Trilobites (among the most ancient of known fossils) were directly related to primitive, shrimp-like crustaceans.

Through the dim eons of time, in the course of evolution, crustaceans developed great diversity in shape, size and habits, but certain characteristics are common to all. They all possess an outer segmented shell or exoskeleton serving the creatures not only as a protective armor but also as a framework for the internal attachment of muscles. Growth of the animal is accomplished through successive molting of its shell, the process being speeded up or retarded in accordance with availability of food and the raising or lowering of water temperatures. Breathing, in the aquatic forms, is by means of gills, the aerated blood circulating within a central chamber to bathe the body organs. Finally, all crustaceans have segmented appendages (like the jointed legs of a lobster) and are supplied with two pairs of feelers.

From this point on, however, the sky is the limit for variation in size and form. Zoologists have found it convenient in classifying and studying this huge group to divide it into two sub-classes: the *Entomostraca* (simple, small crustaceans such as the fairy shrimp, having free-swimming young) and the *Malacostraca* (larger, more highly developed crustaceans). It would be difficult to give either one of these sub-classes an edge over the other in importance to man. The *Entomostraca* have little or no direct value but it does contain the almost countless small forms like the ostracods, copepods and other microscopic varieties which perform the vital function of transforming equally microscopic aquatic plant life into usable protein foodstuff for the more highly developed fishes of the sea. The *Malacostraca*, represented by the larger and more highly developed crustaceans such as the lobsters and crabs, are, as pointed out, of direct value to man in a variety of ways.

As an abundant and popular representative of this group of larger crustaceans, the blue crab (see figure 10) is a convenient model to demonstrate the growth and development of this class of animals. Comparable phases of development, with many variations, are to be seen in other crustacea. The blue crab, as noted in the legend accompanying this article, is a creature of the bays, working up tributaries into brackish water. Here the male blue crabs remain throughout their lives, but the females migrate, through the summer and fall, from the brackish upper bay areas toward the outer reaches of the bays and waters of greater salinity. Here the eggs, fertilized earlier, are spawned and attached as a spongy orange-colored mass to the underside of the abdomen. A large female blue crab may produce as many as two million eggs. Larval blue crabs are called *Zoea* and bear no resemblance whatsoever to the adult. In fact, with their large eyes, elongated spines and fringed appendages they look like Walt Disney illustrations of an outer space nightmare. The *Zoea* float or swim for a time as a part of the plankton.

From the post-larval stage, about 14 months and 20 molts are required for the blue crab to reach maturity. Molting, a pretty strenuous operation, involves the shedding or discarding of every hard part of the exoskeleton including the shell, mouth-parts, eye covering and even the lining of the stomach. During this stage, the crab is known as



a "peeler" and toward adulthood is sought for and sold as the soft-shelled crab. From two to three days is required for the new shell to become hard, the crab increasing about one-third in size each time it molts.

In this brief look at the role of crustacea in the scheme of life, we have no more than hinted at the importance of these creatures to the welfare of mankind. We can only suggest that the next time you approach the subject—maybe as an awed observer of the night-time phosphorescence of the billions of tiny crustacea swimming through the sea; maybe watching the flickering glow of a charcoal fire while you dip lobster into hot melted butter—you'll give due credit to one of the greatest classes of animals alive today—the *Crustacea.*

—AL. BROMLEY

LEGEND FOR COVER AND CENTER SPREAD

1. CARCINIDES MAENES *(Green crab): Occurs abundantly along the rocky shores of Long Island, particularly Long Island Sound. Along the New England coast it is a serious predator upon the soft clams.*

2. PAGURUS LONGICARPUS *(The little hermit crab): Most common hermit crab of our shores, living in rock-pools, behind sand bars and along sandy and muddy bottoms in shallow and sheltered waters. Front pincers not massive like the large hermit's, but elongated and nearly cylindrical. Selects periwinkle and mud snail shells for its home.*

3. OVALIPES OCELLATUS *(Lady crab, calico crab): One of the larger swimming crabs along our sea beaches. Noted for the beauty of its colors. Edible but not much used for food except in the Southern Atlantic coastal states.*

4. UCA PUGNAX *(Fiddler or soldier crab): A sand and mud burrowing crab of our salt marsh shores. Operating from its headquarters or home burrow, it darts about in erratic fashion with amazing speed. Appears somewhat lop-sided because of the great enlargement of one of its two hands or chelae. This big pincer is carried in a raised position and upon the slightest alarm it is extended in a menacing attitude—from whence is derived the name of soldier crab.*

5. CALLINECTES SP.: *A small blue crab of southern waters.*

6. UCA MINAX *(Another species of fiddler crab): Larger than the foregoing. Found far up in salt marshes in brackish or nearly fresh water.*

7. EUBRANCHIPUS VERNALIS *(The fairy shrimp): A freshwater crustacean, living in quiet pools where they appear in late winter and early spring. They grow to be about one inch long; are so nearly transparent one can see the beating of the tubular heart. The fairy shrimp are extremely delicate creatures and beautifully colored in shades of blue, green, bronze and red. They swim about on their backs, their leaf-like gills performing the dual function of oars and breathing devices.*

8. LIMULUS POLYPHEMUS *(The horseshoe crab): A large crab-like marine species which is not a crab at all. Belonging in Class Arachnoidea, its nearest land relatives are the familiar spiders. The shell of the horseshoe crab is a specialized development of leathery, chitinous texture involving the welding together of one-time abdominal joints. The horseshoe crab is one of the few existent descendents of a great prehistoric group, abundant during the Palaeozoic era.*

Discarded shells of the horseshoe crabs are often found on our beaches. They make handy utensils for bailing out boats.

9. OVALIPES OCELLATUS *(Lady crab, calico crab): Same as figure 3; slightly different color phase.*

10. CALLINECTES SAPIDUS *(Blue crab): The number one crab on the epicure's list. Abundant along the muddy shores of Long Island's bays and inlets. They are taken commercially by dredging and by use of crab pots; eagerly sought by individuals with scap nets, baited lines or captured in crab nets or by hand. During certain seasons of the year they may be found at night far from shore—apparently migrating across open bays.*

The Conservation Law in New York provides for minimum sizes below which hard and soft shell crabs shall not be taken.

11. *An amphipod of the family* COROPHIIDAE*—a tube-dwelling group. DeKay identifies the specimen figured as* CERAPUS TUBULARIS.

12. PINCER *of the male horseshoe crab (see Figure 8).*

13. PENEUS BRASILIENSIS *(Shrimp): This species inhabiting our waters is smaller than its southern relative* (P. SETIFERUS) *and not so important on the market. Palaemonetes (the grass shrimps), closely related to the above, are extensively used in Long Island waters by fishermen in chumming for weakfish.*

14. PAGURUS (EUPAGURUS) POLLICARIS *(The large hermit crab): This unique crab of our shores, literally puts its best (usually the right) foot forward, projecting its powerfully formed pincers, along with the rest of its foreward anatomy, from the mollusc shell it has appropriated for its home. Hook-like, lower abdominal appendages enable the hermit crab to fasten itself firmly within its borrowed retreat into which it withdraws when danger threatens, effectively closing and barricading the door with its big pincers. Hermit crabs have a discerning eye (two in fact, mounted on stalks) when it comes to selecting their mollusc shell homes. Shells of the common whelk, the sandcollar snail and the moon shell top their priority list.*

15. TALORCHESTIA LONGICORNIS *(The sand flea or Sand hopper): Very abundant along the sandy beaches of Long Island, burrowing into the moist sand at the water line. As one walks along the beach, following the receding surf, these agile little crustaceans, appearing to be mostly eyes and legs, give the impression of animated popping corn. They subsist upon dead animal substances on the shore and, themselves, furnish an abundant supply of food for the shore birds.*

16. GAMMARUS FASCIATUS *(Fresh water shrimp): A fresh water species, widely distributed in ponds and streams throughout New York State and the eastern and central parts of the United States. Lives under stones and among the submerged leaves and stems of aquatic vegetation. A very valuable source of food for game fishes—particularly during juvenal stage.*

17. PANOPEUS (EUPANOPEUS) HERBSTII *(Mud or Oyster crab): Largest of the mud crabs.*

18. *Lateral view of the beak (rostrum) of the common lobster (see Figure 19).*

19. HOMARUS AMERICANUS *(The American lobster): Perhaps the most highly prized of all shellfish for food purposes—and rightly so! Supports a valuable commercial fishery in our waters, amounting to an average of $170,000 a year. Ever increasing public demand, intense fishing and pollution have combined to reduce and, in some areas, eliminate lobsters along our coast. Lobster fishermen must be licensed by the Conservation Department in New York. Lobsters cannot be taken below a minimum size and the lobster pots used in taking this species are so constructed as to permit the escape of the smaller lobsters.*

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The deer management problem in southern New York

MUCH consideration has been given to the problem of how to improve our methods of deer harvest in the Southern Zone, which for the purposes of this discussion includes all of the State except the Adirondacks. It is the purpose of this article to state the character of the problem before us, the objectives to be considered, and general approaches which might be used to attain these objectives in the management of our southern deer herds.

I would like to start by pointing out that our present management methods in the Southern Zone have resulted in satisfactory herd control in those counties where they have been applied. By annual buck seasons and periodic, hunter's choice seasons of short duration, deer in the Western Range have been reduced to satisfactory levels which are generally compatible with the agricultural and forest economy and the carrying capacity of the deer range. The residual sex ratios following these mixed harvests of does and bucks are conducive to high annual fawn production because there is still an excess of adult does to adult bucks in the ratio of two or three to one, and the does annually are producing fawns at a rate averaging nearly two per adult doe. In addition, roughly a third of the doe fawns are breeding at six to eight months of age and successfully bearing and rearing their little, spotted progeny to add to the annual crop.

However, while we have managed to keep deer under control the crux of our present problem in the Catskills and Western Range is how better to manage the tremendously increased number of hunters now going afield. The opening of short, hunter's choice seasons the last one or two days of the bucks seasons has undoubtedly contributed to this great increase in deer hunting. The hunter concentrations which occur during these short intervals have resulted in unsavory and even dangerous situations in certain localities, and some very unfavorable public reaction. Protests from landowners, non-deer hunters—and from some deer hunters too—point to the fact that we must seek a more orderly achievement of adequate deer herd control. Essentially, our problem is this:

How can we most effectively manage the potential hunting pressure of 400,000

Aerial view of area northeast of the Village of Harford, Cortland Co.—typical of the extensive deer range of the Southern Tier.

to 500,000 big game license holders (over 400,000 big game licenses were sold last year) so as to assure, (1) high hunter satisfaction with the least restriction of hunting opportunity; (2) preservation of the sporting and recreational aspects of deer hunting; (3) properly balanced, annual *deer harvests so as to maintain a high annual production of deer with the least pressure on the deer range?*

Before exploring possible answers to these questions, it should be pointed out that although our methods of harvest in the past have been biologically sound, there is good reason to believe that in the near future a change will be indicated. Over the past few years the breeding base of our deer herd, particularly in the Western Range, has been reduced, although there has been a compensating increase in the fawn groups. However, if the number of deer hunters continues to increase, we must expect a further reduction of deer with a consequent drop in hunter success.

And there is every indication that we can anticipate such an increase in the number of hunters. In 1932, the sale of big game licenses totaled 68,880; in 1942, 176,198; and in 1952 the sale reached a record high of 401,612. If this increase continues, even at a reduced rate, it is quite likely that some kind of restriction on the distribution of hunters will become inevitable.

We turn now to possible means of attaining the three objectives listed above. The following proposals are being studied by the Department:

1. We could continue our present system of seasons (assuming we had no substantial increase in total deer hunting pressure) in the Southern Zone, if all counties will allow periodic, short, hunter's choice seasons open simultaneously throughout the zone. This might alleviate the hunter concentration problem during such seasons by spreading hunting opportunity to a greater degree than has been possible in past years. At the same time, identification of hunters by some form of readily visible marker, a vigorous educational program warning against excessive hunter concentrations and promoting safety, stepping up our vigil against violation of hunting regulations and trespass laws, and fuller protection of the landowner's interests and rights—such measures could aid materially in obtaining more orderly conduct of our present method of achieving adequate deer harvest.

2. The harvest of antlerless deer could be achieved by use of a quota system applied on a county or regional basis. Issue of antlerless licenses would be a separate operation, and the quota could be established on a ratio to the regular buck licenses. The number issued for each county or region would be determined in accordance with the number of antlerless deer whose removal was desirable, and in accordance also with the calculated number of hunters required to effect the removal. Use of the antlerless licenses could be timed to be concurrent throughout the regular buck seasons, at chosen times within the season, e.g. the last two days, or applied to seasons held separately following close of the buck season—as is now the practice in some states.

3. To achieve a maximum measure of control over the number of hunters which could be afield at any one period, and without the use of the quota system, the deer seasons could be divided into two segments, each about a week in duration throughout the Southern Zone. One-third to one-half of the anticipated total licenses to be used in the Southern Zone could be assigned to the first half of the deer season, the remaining licenses to be issued for the second half. Licenses for the two segments would be distinguished by color and identified by a conspicuous marker to be worn by the hunter. Either license would be good for hunting in the Northern Zone.

Hunter's choice seasons could be held on the last one, two or three days of each of the two segments, or held only during the last segment as partial compensation for some disadvantage in hunter success consequent to following the first segment season.

The first approach involving an improvement and broadening of our present system, presents us with the least regimentation of hunters, and barring a great increase in the number of hunters afield, still allows reasonable attainment of our three objectives. The second approach, the quota system, difficult to administer and subject to abuses, introduces rationing of hunter opportunity respecting harvest of antlerless deer. If all hunters played squarely, we could have adequate control over harvest of the antlered and antlerless classes. The third approach introduces quite drastic hunter regimentation which we wish to avoid as long as possible. However something of this sort must be anticipated *if* the popularity of deer hunting continues to increase at its present rate.

Any departure from regulations to which we have become accustomed is unpopular. Sudden and drastic departures can only be justified in emergencies, and in no case can we consider the introduction of change in our deer management methods without the interested public having full opportunity for frank and thorough discussion. This opportunity will be offered at public meetings this fall and winter. —E. L. CHEATUM

Hunter safety education

As reported previously in this magazine, in 1949 the Conservation Department was instrumental in securing legislation to require that all new hunting license applicants 17 years of age or under submit a statement from an authorized instructor certifying that the applicant had successfully completed a course in the safe handling of firearms. To implement the new program, the Game Protectors were designated, the first year, as instructors.

Thus was launched a pioneering step in the nation-wide search for a realistic program to reduce hunting accidents resulting from ignorant or careless handling of firearms afield, and experience during the first year of operation (and ever since) has clearly demonstrated the value of the program. It was found however, that the Protectors could not effectively handle the entire burden of hunter instruction, and in 1950, the Conservation Department sought and secured the cooperation of the National Rifle Association. Admirably suited to undertake the hunter training program, the NRA has succeeded in streamlining the training operation and, based upon its success here in New York, the Association is presently preparing to extend similar services to other states across the country.

But last year we secured legislation which makes it mandatory for all first-time hunting license applicants under 21 years of age to take this training course. By extending the age limits, we also extended our facilities and those of the NRA virtually to the breaking point; the program automatically became so big that additional arrangements had to be made to handle it. Therefore, Assistant District Game Protectors Bryan Burgin and Guy Milroy were assigned to operate full time on the program, under the immediate supervision of Asst. Supt. of Law Enforcement Harold Canepi.

A compelling reason for the special assignment of these two men was the interest expressed in this training program by the Boy Scouts of America, and the 4-H organizations of this State, both of which are now actively participating.

In view of these developments, both the Department and the NRA are confronted with an immediate shortage of instructors to do the actual training work. We have, therefore, contacted all county sportsmen's federations and requested that they in turn contact their local clubs, urging such clubs to have at least one or two of their members qualified by the NRA as instructors. We have also secured the co-operation of the State Education Department in scheduling classes for such instruction in our high schools.

Warm water Fish Populations

A District Fisheries Biologist spends a considerable portion of his time (1) on the telephone and (2) with his feet in the water. These seemingly incongruous activities are more closely related than you might think. When he is "on the 'phone" chances are he's listening to John Q. Sportsman's lament about the poor fishing in Lake X; when his feet are in the water he's out there at Lake X to diagnose the ailment and prescribe the cure.

There are a lot of Lake X's—and even more disgruntled fishermen. After a while the fisheries biologist can not only anticipate the course of the telephone conversation but he can paint a fairly accurate picture of Lake "X"—a small warm water lake (or big pond) having a surface area of about 20 acres, an average depth of 10 to 12 feet with perhaps a 25 feet maximum depth. There are numerous submerged weed beds with a generous sprinkling of lily pads. Fish present include largemouth bass, chain pickerel, yellow perch, common sunfish, rock bass and bullheads. The kids are happy since they can catch small perch or pumpkin seeds without much trouble, but John Q. Sportsman doesn't share this attitude. He doesn't want the sunfish, and the abundant six- to seven-inch perch are a poor substitute for the "jack perch" that he would like to capture. The bass seem to be on strike, and although he can pick up an occasional pickerel around the lily pads, the bullheads won't co-operate either. Most of the rock bass are in the same category with the sunfish—four or five inches long and not worth keeping in the boat.

However, even the most intelligent guess can never be the basis for sound management recommendations designed to effect a cure. Accordingly, an on-the-site investigation must be made. This is the "feet in the water" phase, and it involves a thorough study of the physical, chemical and biological condition. Numbers of the various species of fish present are netted for subsequent age, growth and condition study, water temperatures are taken, chemical analysis made, soundings taken, available food supply analyzed and associated general observations noted. All this information must later be sorted out and then fitted together for the true picture of this particular Lake X.

After many investigations of this nature on warm-water lakes it is apparent that many of such waters fall into a single category with respect to the problems involved. Typical symptoms are the presence of too many fish, rather than a scarcity of fish; and these are fish of either undesirable size or species, or both. But the fact remains that the water is producing a large *poundage* of fish, and it has long been accepted among fisheries workers that fish production is best measured in terms of poundage rather than numbers: A given body of water will produce a certain poundage of fish, the magnitude of which will depend on the water's carrying capacity. The fish making up this poundage may be of one species, or they may be composed of several species. The same principle applies to the size composition; the poundage may be made up of numerous small individuals, or of fewer large individuals.

Examples of such situations are not difficult to find. Many small bullhead ponds that once produced catchable-size bullheads according to oldtime local residents are now known to produce only "runts" three or four inches in length. Fishermen, with the possible exception of youngsters, avoid fishing in these places, and the fish are left to multiply and stunt due to lack of an adequate food supply.

Other species of fish follow much the same pattern when they become overabundant. It is not uncommon to find small and unusually shallow ponds where the common sunfish or pumpkin seed has reproduced and multiplied to the point where individuals do not exceed three inches in length. Several such ponds examined in early summer have shown literally thousands of mature spawning sunfish on nests less than a hand-breadth apart.

The two examples cited above are cases of severe stunting, but intermediate stages of stunting involving several species of fish in one body of water are far from uncommon. The same principle may be seen in your garden. When we were kids, with our own little plot in the vegetable garden we didn't like to thin out the rows since it seemed a waste to pull out some of the small plants. But we soon found that without thinning, many plants were produced and none ever grew to a harvestable size. Garden weeds—which for our purposes of comparison can be considered additional fish species—further complicate the situation.

Since John Q. is no different from most other fishermen, he naturally wants to keep only the large fish. He has heard all his life that you should return the small ones so they will grow up. But in the situations we're talking about here, it would be better to remove the stunted little fellows so their relatives would have less competition for food. Most warm-water species—what with their high reproductive capacity—are more than able to maintain an adequate supply of young fish; some of them furnish forage for larger fish, while others will grow to maturity. If there aren't enough large predatory fish to thin down their numbers they may multiply to the point where they are too abundant for the available food supply.

Sportsmen themselves through selective fishing for the large predatory game fish species and in ignoring or returning to the water all small, undesirable species—unknowingly aggravate competition for food.

The lakes and ponds where predatory fish predominate are few when compared with the waters where forage fish, stunted panfish, or "weed" species are dominant. The diagnosis of this condition is not nearly so difficult as effecting practical corrective measures.

However, the fishery biologist who does not follow up the correct analysis of a lake's ailments with management recommendations is not fulfilling his obligations. He is in the same position as the doctor who, diagnosing a serious malady, leaves the patient with no prescription and the family with a few consoling remarks—"Too bad, nice fellow, sorry to see him go."

In "curing" Lake X, there are various prescriptions which may be effective, used singly or in various combinations dependent upon the individual character or situation. An obvious first step is an effort to educate Lake X fishermen—show them the relationship between game, forage and panfish species; dependency on limited food supply; solicit their co-operation as fishermen in helping to balance production through greater utilization of the panfish species. Sportsmen's clubs can be of great help in this effort. (See "Fishermen's Clinic" —last issue.)

The fisheries biologist may also find netting effective. Large scale removal of stunted panfish by haul seining and trap-netting has materially improved the growth and condition of preferred species in many waters. Successful use of this technique is dependent, however, upon the physical character of the individual lake and the susceptibility of the species to netting.

Selective stocking is still another possibility. "Selective" is the key word here. Merely dumping in more of the "problem" fish is like cutting a hole in the bottom of a foundering boat to let the water run out. But if stock is available, and the lake is "right" for the species liberated, the release of larger predatory species may turn the tide.

But sometimes none of these measures, used singly or in combination, will effect a cure. Confronted with such an impasse, the fisheries biologist may fall back upon his most ruthless prescription —kill off the whole "mess" by poisoning and begin over again. This, admittedly, is rough medicine and must be administered with great caution after carefully weighing the potential gains against the cost; checking and guarding against all possible repercussions — human and otherwise.

We have more Lake X's than any other kind. We have enough to keep the District Fisheries Biologist on the 'phone or with his feet in the water for years to come.

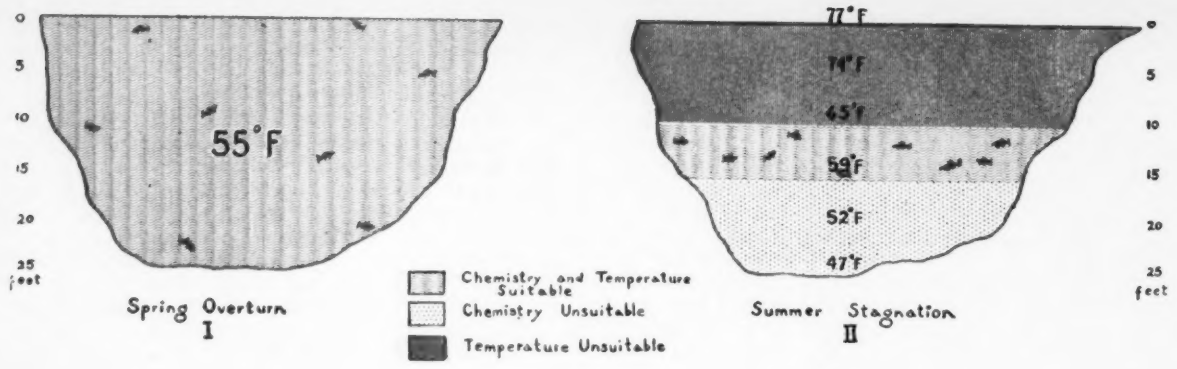
—A. C. Petty, *Sr. Aquatic Biologist*

Brook Trout and the Summer Complaint

Summer complaint is an old fashioned name for an ailment of vague and various symptoms—maybe just a stomachache—recognizable principally because it descends upon the sufferer in the summertime. Pond trout fishermen have a more serious summer complaint: The trout just don't bite, and the reasons for their lack of enthusiasm in warm weather have seldom been any more clearly diagnosed than Grandpa's stomachache.

The difficulty of catching trout in ponds in the summertime is one reason so many trout ponds have been ruined by introduction of various warm-water species; fishermen simply got tired of spending fruitless hours trying to catch trout, and decided to import a kind of fish that would supply some action. No one then knew the drastic consequences to be expected from such a prescription for the fishermen's summer complaint, but it turned out to be a glaring example of one of those remedies that is worse than the disease. But since Grandpa's day, we have made some progress in diagnosing fishing "summer sickness," and possibly an attempt to analyze the reasons for poor trout fishing in ponds during warm weather will tend both to enhance the value of trout ponds and to make trout fishermen less gloomy during the dog days.

As the ice goes out of the lakes and ponds, the brook trout become voracious feeders. While excellent fishing may be had during April, May and early June (depending, of course, upon how obliging the brook trout are in taking the lure) very few fishermen continue to pursue the brook trout in ponds throughout the



summer months. The reason is simply that they cannot catch them, and such failure often gives rise to the opinion that the ponds have been fished out during the spring fishing period. That this is not generally the situation has been repeatedly shown by netting and by age determinations of trout taken in the nets. For example, a net set overnight in the fall of 1952, in a 50-acre pond that was thought to be fished out, picked up over 300 legal brook trout. Another pond of 15 acres yielded almost 100 brook trout, many of which had been of legal size during the season just closed. All of which goes to prove that in the good ponds the trout are there all right. But they are distributed differently than in the spring, and consequently must be fished for differently.

What is the difference between an average brook trout pond in the spring, and the same pond in summer? There are two very important differences—temperatures and chemical conditions, and in explaining them two extreme examples are cited: The first is the condition in a pond in the spring when spring overturn has taken place (see Figure I); the second, the condition when summer stagnation is most acute (see Figure II). In using these examples, it must be remembered that as spring merges into summer, the change from the spring overturn toward summer stagnation is a gradual one. The diagrams presented here will help demonstrate how temperatures and chemistry affect the fishing. Figure I shows a cross section of a typical 25-acre Adirondack pond during the spring overturn, and Figure II the same pond during summer stagnation.

During spring overturn, temperatures of deep and shallow levels equalize, pond waters become thoroughly mixed, and temperature and chemical conditions are favorable for brook trout from top to bottom. They usually remain so for some weeks, and under these conditions a lure presented at any depth in the pond may catch a trout.

But conditions are entirely different as summer stagnation occurs. What we call thermal stratification takes place, and a definite temperature pattern develops in the pond—with warm water on the surface, cold water on the bottom, and intermediate temperatures in between. In our diagram (as far as temperature is concerned) any depth below 10 feet is a suitable area to angle for brook trout. The other important factor, chemistry, also limits the distribution of trout in the pond. In the summer dissolved oxygen becomes depleted and carbon dioxide concentrations rise in the deeper waters of most trout ponds. In the diagram (Figure II) oxygen conditions have become critical for brook trout below 15 feet. This leaves in the pond a narrow band of water between 10 and 15 feet which is the preferred summer habitat of brook trout. This five-foot layer of water should be fished for most effective angling in this pond.

The depth and thickness of the zone inhabited by trout in summer varies considerably from pond to pond in waters of this type. In very brown water ponds it may be between four and eight feet below the surface or even less; in white water ponds it generally runs deeper, as clear water permits deeper penetration of light and heat. The important fact is that, while water suitable for trout does remain in these ponds, it is reduced to a comparatively thin horizontal layer.

When related to usual methods of fishing for brook trout in ponds, this type of distribution of trout inevitably leads to poor fishing. The worm fisherman fishes near bottom, the fly fisherman near the surface. Trout in the middle seldom see a lure.

The spring hole is another condition encountered in the summer in some trout ponds. In shallow ponds that have practically the same temperature from top to bottom in the summer, brook trout will retire to cool spring holes. A recent survey of a brook trout pond in Hamilton County having a water temperature of 74° F. at both surface and bottom of pond revealed well over 200 legal trout in one spring hole, and lesser concentrations in several others. Thirty-two legal brook trout were taken at this spring hole with wet flies. Yet this particular body of water was reported to have been fished out. Spring holes may also be present in ponds that have thermal stratification, but trout are not entirely dependent on these for survival and large concentrations are not generally found in stratified ponds.

In some of the unstratified ponds with no adequate spring hole areas, brook trout may be unhappy in warm weather because temperatures are unfavorably high, although not warm enough to be lethal. In these waters the brook trout will not feed actively while critically high temperatures exist—one reason why anglers sometimes can see trout but can't get them to bite.

We don't mean to suggest that the modern angler should fare forth with chemistry kit and reversing thermometer. Nevertheless, being forewarned, it may be possible for him to find some spring holes, or by trying different depths, to find that narrow band of water where trout do most of their feeding during the summer. Summer complaints about trout will, of course, continue, but knowledge of their causes may reduce them somewhat and may lead to better utilization of our brook trout resource, especially in Adirondack ponds.

—R. G. Zilliox,
Senior Aquatic Biologist

The specimen of Squaw-root illustrated here was collected by Bill Smith, of our Bureau of Forest Pest Control, on Candlewood Island in the lake of the same name north of Danbury, Connecticut. That's just a few miles across the State line from Putnam County, N. Y. (Bill was on vacation at the time but that didn't keep him out of the woods.) The place nearest to this in New York where the plant has been found is a few miles east of Poughkeepsie.

The fact that Bill Smith, who has travelled up and down the forests of New York these many years looking for bugs (and who keeps his eye peeled) didn't know the identity of this curious plant—that's a good testimonial as to its rarity.
—Editor

Squaw-Root

By Stanley J. Smith,
Senior Curator, Botany Office, New York State Museum

IN rich woods, on sunny slopes bordering the larger valleys of New York State, one may, in late spring or early summer, run across a peculiar growth reminding one faintly of a cluster of fleshy cones the color and texture of which is somewhat like some of the mushrooms, but with curious flowers peering out from the upper scales. This apparent mixture of fungus, pine cone, and flower is the Squaw-root (*Conopholis americana*), a member of a cosmopolitan family of root-parasites to which belong the Cancer-root, Broom-rape, and Beech-drops.

The plants start in the spring as a cluster of thimble-like yellow-buff nubs surrounded and overlapped by narrow thin chestnut scales. This stage may be completely hidden by fallen leaves. These nubs elongate to a length of 1½ to 8 inches and attain a thickness of perhaps an inch, pushing the covering of the forest floor aside as they grow. (Sometimes, if conditions are right, the mature plant is surrounded by a small stockade of dead litter.) The entire plant is covered with lance-shaped fleshy yellow scales, the lower of which approach an inch in length. The flowering spike usually takes up about half the length of the stem, while the scales are smaller. The small curved tubular flowers (one from each scale) are creamy white to pale yellow and are fringed by extruded anthers.

As the plant ages, the tips of the scales (which start yellow or pale brown) deepen in color and sometimes, at least, the whole plant ends up a soft yellowish or reddish brown with the withered corollas pushed aside by light brown capsules about as long as the covering scales. At this stage, the cone-like appearance is more marked than earlier.

This species is usually found associated with oaks. Notes of Dr. Homer D. House, former State Botanist, indicate that he considered it parasitic only on the northern red oak, although it has been found on white oak in Dutchess County, and probably parasitizes other kinds of oak as well. The general range of the species is said to extend from southern Florida and Alabama to Nova Scotia and Wisconsin. (Other species of the genus are known to occur in the southwestern United States, Mexico, and Central America.) In New York State, the plant is occasional in woods (either oak-hickory or oak-chestnut or types transitional to these) south of the Adirondacks, except for a few occurrences north to Lake George. It is rare on Long Island and Staten Island and missing from most of the Catskills. It has been found near Burlington, Vermont, and opposite Ogdensburg in Canada, so that it should be sought along the valleys of extreme northern New York.

The parasite seems to have little effect on the host, other than to produce a small burl on the larger roots. This may reach a diameter of a few inches and good specimens are collected by jackknife, including the burl, and preserved in boxes. This weak disrupting of the host is comparable to that of Beech-drops with regard to beech, but in sharp contrast to some of the Broom-rapes which are destructive crop-parasites.

Altogether, the Squaw-root is a most interesting member of the flora of our State. Parasitic as it is, it still is a remarkable citizen.

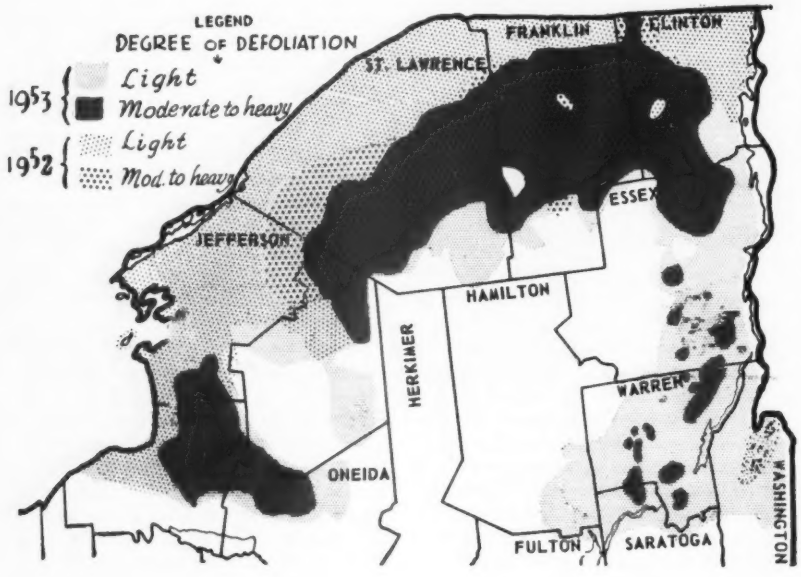
Tent Caterpillars

on the rampage

WITH the specter of fire looming over the hurricane-blasted Adirondacks, little publicity has been given to another serious menace to our northern woodlands—the epidemic outbreak of forest tent caterpillars. Approximately seven and one-half million acres of our northern and eastern forested lands have been partially or wholly defoliated by the caterpillars this year.

This plague is of immediate and personal concern to residents of the North Country, who have had caterpillars crawling over their clothes, down their necks, into their food and their beds. And eating their inexorable way over hardwood slopes, the caterpillars have changed much of the North Country from green to brown. They have pyramided to such abundance in some areas this season that trains have been stalled for half an hour or more while caterpillar-greased rails were sanded to secure traction.

The forest tent caterpillar, like its close relative, the eastern tent caterpillar, is a native of these United States. However, there are many differences between the two pests, the most important of which (from the standpoint of forest pest control) is their host plant preferences. The eastern tent caterpillar (or as it is commonly known to many, the apple tree worm) shows a preference for the foliage of wild cherry and apple trees growing in open or semi-open stands. It builds a conspicuous tent. The forest tent caterpillar, on the other hand, shows a decided preference for the foliage of poplar, sugar maple, birch, oak and ash. Damage caused by this insect is most noticeable in large forest areas where the extensive foliage loss is most evident. In contrast to the habits of its cousin, the eastern tent caterpillar, the forest tent caterpillar constructs only a small, inconspicuous mat-like tent on the trunk or branch of the tree.



Foliage feeding over large areas by the forest tent caterpillar has been noted periodically since the time of our earliest records, a heavy outbreak occurring in the late 1800's. However, these records show that the periodic outbreaks do not develop in any definite cycle in terms of years, and they also show that heavy infestations come about with great rapidity—probably when a combination of factors all favorable to the insect develop. It is known that after a period of three to five years of outbreak populations, there is a sudden lessening in intensity due to the action of natural control factors such as parasites, predators, and a disease of the caterpillars known as "the wilt."

Even though we can feel fairly confident on the basis of past experience that natural curbs will develop and that the demise of the caterpillar hordes will be further hastened by the application of modern control methods, we still must view the present epidemic with grave concern. This is particularly true in the extensive sugar bush areas and forest recreational centers of our State. Repeated defoliation of the sugar maples will check tree growth, limit maple sap production and, if continued through successive seasons, result in death of the trees upon which the major sugar products industry of the area depends. The effect upon recreation is more immediate; people just don't like to go into an infested area.

The ravages of these caterpillars first assumed serious proportions during the season of 1951 in an area of about 110,000 acres in Franklin and St. Lawrence counties surrounding Lake Ozonia. Investigation revealed that they were numerous in this district in 1950, but apparently not sufficiently troublesome to cause reports to be made to the Conservation Department. Counts of egg-masses on the twigs of trees in the infested area were made in the fall of 1951 for the purpose of determining the expected intensity of caterpillars for the 1952 season. All indications pointed toward another heavy outbreak for 1952, and over a much larger area. Accordingly, plans were made for the 1952 spraying of the area about Lake Ozonia to protect it from another complete defoliation.

By mid-May of 1952, field checks revealed that our prediction of another heavy outbreak was correct. An area of 624,880 acres in northern and eastern New York was nearly 100 per cent stripped of foliage that year, and an aerial survey of the total damage showed partial to complete defoliation over 3,762,440 acres. This was within a strip 20 to 40 miles wide along our northern and eastern state boundary, between Oswego and Plattsburgh on the north, and south to Glens Falls along our eastern border.

The area about Lake Ozonia was sprayed as planned—with excellent results. While only a low dosage of ½ pound of DDT in a gallon of solution was applied to each acre treated, it provided complete protection for the foliage. Later in the season, following spraying, the treated area appeared like a green oasis surrounded by a desert of brown caused by caterpillar feeding. The section dam-

aged was so extensive and the defoliation was so severe that many requests for assistance were made to Conservation Commissioner Duryea by local groups. After due study and consideration of the problem, Commissioner Duryea agreed that Conservation Department personnel and equipment could be used to make the required pre-spraying surveys of the areas most justifying treatment, and for making the required spray applications with State airplanes. It was agreed that the counties concerned would purchase the insecticide needed.

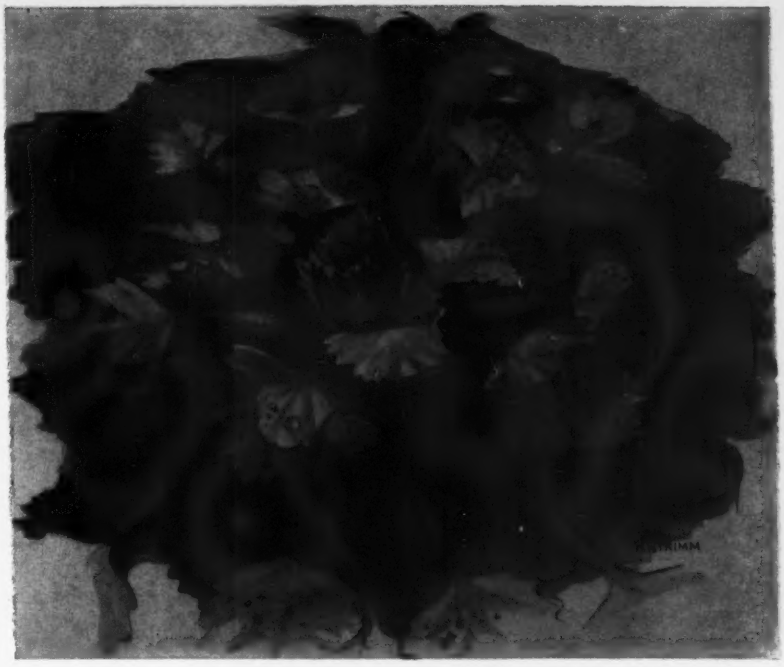
The Counties of Washington, Clinton, Franklin, St. Lawrence and Lewis readily accepted this proposition, and the work of mapping and marking for aircraft spraying got underway. Knowing that sugar bushes, numerous throughout the infested area, would suffer considerably from repeated defoliations, it was decided to concentrate efforts on protecting them and to apply the remaining spray potentialities of the two 'planes to lakeside areas. A total of about 20,000 acres of such lands were laid out for treatment. This acreage was made up of 596 separate land blocks varying in size from 3 to 1,000 acres each.

The spraying for 1953 was initiated in Washington County on April 29. Following completion of work there, the 'planes moved to Lewis County and then progressively across northern New York to Clinton County. Due to an excessive amount of lost time caused by the wettest May on record (plus the usual time lost due to fog and wind) about 2,000 acres of the areas planned for spraying were still untreated when operations were terminated on June 10. It was found necessary to discontinue operations at that time due to the advanced stage of the caterpillars, which indicated that their feeding was about over for 1953 and that further spraying would accomplish little in the matter of control.

According to an aerial survey made in July of this year, probably the largest area in New York State ever stripped of foliage by caterpillars in a single year occurred during this 1953 season. The survey shows that defoliation in some measure took place over 7,489,049 acres and that 919,834 acres of this total suffered nearly complete loss of foliage. Recent spread of this pest now causes the Conservation Department additional concern, due to envelopment of many of the most popular State-controlled public recreational areas in the infestation.

It is now planned to repeat our aerial surveys and ground egg-mass checks to determine what the outlook is for 1954.

—C. J. Yops,
Sup't. Forest Pest Control



Water chestnut control

About 70 years ago, the water chestnut was introduced into Sanders Lake at Scotia (near Schenectady) by a resident who thought to beautify the little lake. Today, because the plant exhibited unexpectedly aggressive tendencies and can grow in waters between three and sixteen feet in depth, it represents a threat to the shallow water areas of the entire State. It has spread from the point of introduction downstream until it has invaded the nearby Mohawk River, then down the Hudson, and it has choked many hundreds of acres of the backwaters of lower Mohawk and Hudson between Schenectady and Peekskill. Its dense growth, which results in completely blanketing the water surface with dark green leaves, makes it a serious pest since swimming, boating and fishing soon become impossible. It also prevents growth of more desirable aquatic plants.

The best information that the Conservation Department could obtain—when serious attempts to control the plant were started just after the War—was that the plant was an annual, and that the large chestnut-like seeds, if they didn't sprout the first spring after ripening and dropping, rotted. It is true that the plant sprouts from the chestnut in the spring and dies with the fall frosts. But we have found that even though the plants were killed or removed before they could ripen seeds, there were as many plants in the same location the next year.

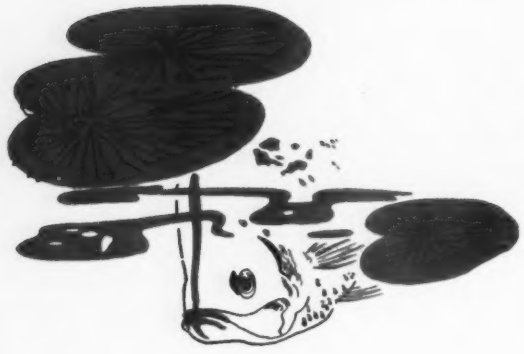
This discovery, which indicated that the seed had the ability to lie over more than one season and then sprout, made the control and elimination of the plant much more difficult and expensive than we had expected. It was therefore decided that the best strategy to control the plant was to prevent its spread to new areas, and wait for assistance from other agencies in the difficult and large scale control job needed in the main infestations. Reconnaissance was conducted each year to try to bring to light new pond and lake infestations, and for reasons difficult to determine, the plants have been found in new locations far from known places of establishment. For example Don Foley, Waterfowl Investigator, discovered scattered plants in Keuka Lake near Branchport in 1951—the farthest known point of growth from the point of introduction.

The Department control crew is now busy spraying the denser growths in the outlying areas with a 2,4-D weed killer. They are also hand pulling the more scattered growths. Although results are encouraging, we need public co-operation, and if the reader sees the plant sketched on this page in an area not listed below, please inform us at once.

1. Mohawk and Hudson Rivers from Scotia to Peekskill; 2. Mohawk River near Sprakers; 3. Cranesville; 4. Hudson River at Coveville; 5. Erie Canal bed near Geneva; 6. Round Lake; 7. Saratoga Lake; 8. Dunham Bay in Lake George; 9. Tomhannock Reservoir; 10. Burden Pond, Troy; 11. Smart Pond, Troy; 12. Carswell Pond near Ft. Miller; 13. Lake Champlain narrows; 14. Keuka Lake near Branchport; 15. Ann Lee Pond near Albany airport.

—A. W. Holweg

THE BACK OF THE BOOK



Scattershots

And Department Activities

Busy box

There is a woodduck nesting box on the 10-acre wildlife marsh pond of Jesse DeMay in the Town of Sodus, Wayne County, which seems to have a most unusual attraction for wildlife.

The box, located about 18 feet above water in a large willow at woods' edge, was appropriated during the past winter by a screech owl. In April, Robert Cottrell, while making a routine check of the woodduck boxes, observed that the screech owl had moved out (a female screech owl nested in another box about 300′ away) and that a female gray squirrel had moved in and was rearing a healthy litter of young ones.

By the first of June, the squirrels had broken up housekeeping, and a female woodduck was able, finally, to move in and start her family; a little late in the season perhaps, but better late than never.

Apparently the housing shortage is as acute for wildlife as it is for *Homo Sapiens.* —A. S. TAORMINA

What price fishing

If you feel that our fly-fishing-only experiment smacks of "class legislation" and introduces a lot of unnecessary complications, take a look at what follows. We got it from Art Flick of Westkill, who had some friends who wrote to Austria to find out about trout fishing over there. Here is the unedited answer they got:

Instructions for fishing on the Traun-river.

The fishing on the Traun-river is dividet in 3 zones: Zone I from the outflow of the Traun-river to "Hamstockmuhle." Zone II from "Hamstockmuhle" to "Danzermuhle." Zone III from "Danzermuhle" to the electric works "Siebenbrunn."

Taking a license the amateur-fisherman engages himself to observe the following conditions:

(1) Fishing is allowed with the artificial fly only. Catching period for trouts (all 3 zones): 1.5-30.9. (May 1-Sept. 30; May 16-Sept. 30.—Ed.) Catching period for graylings: 16.5-30.9. Minimum size for trouts: zone I 40 cm (16 inches) zone II & III 30 cm (12 inches). Minimum size for salmons: zone I, II & III 50 cm (20 inches). Minimum size for graylings zone I, II & III 30 cm (12 inches). Caught fish being less large than that size have to be carefully detached from the fishing-hook and put back into the river.

(2) At zone II and III fishing for pikes with pliable fishing rod is permittet. Minimum size 40 cm (16 inches).

(3) Catching time is from sunrise until 2 hours after sunset (22) hours. Fishing during the night is stricklly prohibitet.

(4) The assigenement of amateur-fishermen will be made by fishermen of the Forest Administration only. These fishermen are employed with the Forest Office and are paid off by it. Therefore the amateur-fishermen have no compensation to pay to the instructing fishermen. Amateur-fishing is to be practised only accompanied by a fish-box porter. These fish-box porter will be providet if possible by the instructing fishermen. Minimum-pay for fishbox-porter amounts to 3.-S per hour by fishing on the bank, 3.50 S. on the boats an to the flats. Waiting time and every hour begun is to be paid fully. The caught fish are property of the Forest Administration and are to be delivered

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Pope Advised to Work Less

Cyclist Injured in Head Mishap

DEESIDE ESTATES SUFFER HEAVILY

It can happen here, But this happened in Scotland

On page 4 of our June-July issue, we published a couple of pictures one of which we now give you again. The reason for the repetition is that we neglected to include an explanatory caption in our preceding issue, although we did mention the source in our picture credits.

This blow-down, which looks so much like our own Cold River country after the hurricane of November, 1950, occurred in the northern part of Scotland in February, 1953, and the photographs were copied from the February 9 edition of the Aberdeen (Scotland) *Press and Journal.* A copy of this edition of the paper was sent to us by Charles Boone, Editor of the *New York Forester,* and we herewith profer our delayed thanks.

alive. They can be bought by the amateur fisherman at the respective fixed prices.

(5) The licenses are not transferable.

(6) No indemnification will be paid for prececious breaking off or interuption.

(7) Violation of above mentioned conditions results the loss of the license without repayment of the fees.

(8) The fee for fishing license amounts to S 80.-for 3 days, to S 120. for a week, and to S 200.—for one month.

It's for free

Sportsmen accustomed to mile after country mile of uninterrupted proclamations reading "Trespassers will be Prosecuted to the Fullest Extent of the Law," "Keep Off," "Positively No Hunting or Fishing," will be pardoned if caught with their mouths hanging open before posters like the above. It was put up by Aaron J. Van Valkenburgh in Spruceton, N. Y.

Greater consideration by more sportsmen of the landowners' rights would help to spread this idea.

Tree and shrub guide

There always seems to be room for one more book on trees, and this is certainly true of the handy volume published recently by the former Curator of the Brooklyn Botanic Garden, who has found time between his experiments in breeding hybrid chestnuts (see THE CONSERVATIONIST April-May 1950) to prepare, out of his 40 years of curatorship and public instruction, a tree and shrub guide which is both scholarly and practical.*

The work is original in its approach, emphasizing both in text and illustration the *particular* features which serve to distinguish a given species from others which are similar or closely related. Extensive use is made of twig and bud characteristics (so invaluable for winter identification), and to this end the sketches by Miss Maud H. Purdy, former staff artist of the Brooklyn Botanic Garden, are particularly helpful. These illustrations, life-size or larger, are of almost photographic accuracy with respect to the parts shown, yet they manage, by the omission of non-essentials and by the skillful use of the artist's shading devices, to bring the distinctive structures into remarkably bold focus.

Most manuals of this sort restrict their coverage to the native species of a country or region, but Dr. Graves has been able, with the wealth of material he had at hand, to include all of the more common and some of the unusual exotics. Thus, interspersed among the familiar conifers of our own Northeast we find the description of such visitors to our shores as *Pseudolarix amabilis, Cedrus atlantica, Sciadopitys* and *Pinus thunbergii*. The broad leaved group includes among others the European beech and its varieties, several of the oaks and elms from abroad, the Katsura tree *(Cercidiphyllum)* and both English and Japanese hollies. Nearly all of the generally-used ornamental shrubs, both native and exotic, are included.

The book is provided with a wealth of keys, both for summer and winter identification, and with a glossary of terms used, and list of references.

For the professional forester, arborist or landscape architect this work should prove not only intriguing but something to be kept at hand for ready reference. But also for the layman, who wants to identify the various trees and shrubs he comes across on his hikes or in city parks, or who wants to know more about woody plants that he can use in his home landscaping, the book will provide a welcome store of information.

—E. W. LITTLEFIELD

* *Illustrated Guide to Trees and Shrubs.* By Arthur Harmount Graves, Ph.D. Published by the Author, Wallingford, Connecticut. Price $4. 240 pp., 45 pl. and 116 text fig.

Tree marker

The Eagle Tree Marking Gun now employed in District 5 (Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans and Wyoming counties) for marking timber with paint has been found far superior to anything heretofore used. Increased "mileage" (number of trees marked) from one pint of paint is one of its best features. Gun clogs can be easily remedied with a fine wire without taking the gun apart; another advantage is that paint is concentrated in one spot on the tree and not sprayed all over the woods (including the marker).

Salvage report (13)

Because of the large pulpwood inventories being carried by New York's pulp mills, and because of a highly competitive and limited paper market, the demand for pulpwood continues to remain very light. Consequently, operations on the various salvage projects are not progressing as rapidly as might be desired. The market for sawlogs, however, is holding steady. As of July 8th, 36 out of 91 incomplete contracts were active. Of the 136 projects sold through June 1st, 45 have been completed. Seven new projects were sold during June.

The status of the salvage operations on June 1, 1953 was as follows:

	Executed Contracts	Unsold Contracts	Total
No. of Projects	136	32	168
Acreage	106,698	70,155	176,853
Cords	234,021	239,625	473,646
MBF	30,381.5	10,460	40,841.5
Estimated Receipts	$1,031,517.35	$845,878.75	$1,877,396.10

RECEIPTS

	Cords	Receipts
Softwoods	211,381.29	$691,493.44
Hardwoods	548.63	1,072.28
Total Pulpwood	211,929.92	$692,565.72
	MBF	Receipts
Softwood Sawlogs	18,141.341	$139,383.28
Hardwood Sawlogs	9,452.138	106,409.94
Total Sawlogs	27,593.479	$245,793.22
Total Pulpwood and Sawlogs		$938,358.94
Local Sales		81,857.49
Total Cash Receipts		$1,020,216.43
Campsite salvage (Est. value)		48,480 00
Add. State Salvage, 1952 (1,250,000 BF @ $85/MBF)		106,250.00
GRAND TOTAL		$1,174,946.43

The Bloomingburg Oak

"Probably the oldest living thing in this part of country"

In no hurry to unfold its leaves to the spring sunlight of 1937 is this white oak which shades a hundred-odd graves in Bloomingburg Cemetery. When the leaves of its maple neighbors were half-opened, the white oak's were yet in bud as it greeted another season with the dignity befitting its years.

Although the more-publicized Balmville tree sometimes has been called the oldest in Orange County, the Bloomingburg white oak is at least an eligible claimant for the title. The oldest estimate of age of the Balmville tree places its beginning of life about 1666 while other traditions make the date ninety years more recent. Two authorities estimate the white oak's age, based on the circumference of eighteen feet two inches, at "between 300 and 400 years."

Quite possibly the white oak was a sapling when Henry Hudson sailed his Half Moon up the Hudson in 1609. With reasonable certainty it may be said that it had reached the beginning of its maturity before a white man saw it. A church on which it cast its shadow disappeared so many years ago that only fragmentary records of its existence remain. One historian (Ruttenber) writes: "The congregation of Union Church of New Shawangunk effected a legal organization September 23, 1799. . . . This church had a house of worship known as the 'Old Union House' on the present Shearer place, near the Bloomingburg mills. The cemetery still indicates the site of the early meeting house."

Oldest dated gravestone beneath the tree bears the inscription 1799 although other unmarked fieldstones may be older. The sepulcher of the first pastor of Union Church, the Rev. George Stewart, stands beneath the oak's branches.

The story above was written by William J. Embler (now a Deputy Comptroller in the Department of Audit and Control). Last year, the oak was struck by lightning, and the scar from this strike can be seen in the photograph. The tree, which District Forester S. G. Bascom describes as "the oldest living thing in this part of the country" has a circumference of eighteen feet six inches and a diameter breast high of seventy-one and three-tenths inches. According to Bascom, the tree needs some work by a tree surgeon, and also some feeding. Otherwise, its prospects of living many more years appear good.

Salt water survey

The Conservation Department has initiated a statistical survey of the sport fishery of the Marine District as part of a program sponsored by Federal Aid to Fish Restoration, Dingell-Johnson Act. This survey requires the co-operation of every salt-water angler, boat captain, boat owner, bait or tackle dealer, and other persons interested in preserving our natural marine resources for future use.

It is essential that we know what supply of fishes is available during any one year and how the number of fishes compares from year to year. This can only be accomplished by a survey of the number of fish caught by the myriad fishermen throughout the Marine District. By compiling the "catch per unit of effort" we can secure information on availability of the different species from season to season and from year to year, and provide a factual basis for an estimate of how well we utilize our local supply of fish.

In order to facilitate the collection of the vast amount of data needed to make this co-operative project a success, three types of forms, all simple in their execution, have been distributed throughout the Marine District. These forms will enable fishermen, boat captains, and other persons to keep accurate records of their catch with a minimum of effort for this year, and continually thereafter. The first form is a simple, postage-free reply postcard which should be filled out and mailed by every surfcaster, dock, jetty or shore fisherman, or those who fish from their own rowboat, outboard or other auxiliary craft. The catch as recorded on these postcards is a daily record and should be mailed to us even though no fish are caught. These cards have been distributed to bait and tackle dealers throughout the area, and are also available through local rod and gun clubs. A second type of form has been prepared as a printed tablet and is provided to charter boat and open boat captains and to private boat owners. In this case, the record of catch is kept daily for a month on a single sheet, and since each pad contains 24 sheets (a carbon copy of each month's catch should be kept by the co-operator), an entire year's supply is on hand. Postage-free confidential return envelopes are also supplied and the entire kit is placed in a waterproof envelope so that it may be kept aboard and easily available. The third form is similar in style to the one described above, modified for use by owners of rowboat stations for reports on the daily catch from their boat liveries. In many cases, the biologist in charge of this project may stop to pick

up the completed forms during his itinerary but, in any case, the individual postcards should be mailed in as soon after a fishing trip as possible and the monthly reports of boat captains and rowboat station operators at the end of each month so that the information will not go astray.

The final analyzed and tabulated information will be arranged according to statistical areas for later publication, but no individual catch records will be released and all information will be strictly confidential.

It is to everyone's interest that the conservation of our marine fishes, based on sound biological principles, be encouraged and abetted. It is particularly fitting that the people who derive pleasure and profit from the seas and inshore waters are the people who can provide us with the necessary information to keep these waters productive.

Catch record forms and further information may be secured by writing to the State of New York Conservation Department, Bureau of Marine Fisheries, 65 West Sunrise Highway, Freeport, New York, or by calling Freeport 8-3233.

—IRWIN M. ALPERIN,
Aquatic Biologist (Marine)

Fish on TV

Television has now gone submarine. We have at hand a report from the Canadian Wildlife Service, describing experiments made in Lake Minnewanka (in Banff National Park), in which television cameras were lowered to depths of 100 feet in order to record what was going on down there. According to the information we have, the cameras were equipped with strong searchlights, and the picture was piped by cable to a screen in a boat on the surface. Observers in the boat were provided with a clear view of the fish below, their habitat, and the various forms of natural food at that level.

The equipment used represents three years of intensive research at the Radio and Electronics Laboratories near Ottawa, and was used for the first time in North America in Lake Minnewanka. Judging by preliminary reports, it appears that when perfected such equipment may have great significance in fisheries investigations.

Roadside cover

The New York State Department of Public Works has just issued a Roadside Vegetative Cover Research Project report worthy of attention. The project was under the direction of Nelson M. Wells, director, Landscape Bureau, and Harry H. Iurka, senior landscape architect of the Department, in conjunction with Cornell University, Rutgers University and a group of outstanding authorities in matters relating to soils and turf.

The report summarizes the knowledge gained throughout the northeastern states since 1940 which is applicable to roadside conditions, and emphasizes the fact that great economies can be effected in the methods of establishing turf during the construction of highways.

We think the report will be of interest and value in other fields—in fact, to anyone interested in establishing ground cover under difficult conditions.

Your pet

Need a name for your pet? You can get it for just $1. We have just picked up an advertisement from a concern in California which says they will refund your money if you are not delighted with the 1001 suggestions they offer for naming your pooch, parrot, or what have you.

FIGURES ON HUNTING ACCIDENTS

LICENSES

	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952
MAINE	98,019	105,774	104,461	109,602	109,822	113,731	119,365	133,321	124,267	154,815	162,175	167,000	172,000
MICHIGAN	718,334	845,601	794,409	731,698	784,604	827,025	1,039,546	910,719	968,292	1,011,053	1,001,000	1,030,000	1,135,000
MINNESOTA	306,283	295,473	372,231	330,791	327,633	349,542	401,087	344,000	503,543	477,024	331,990	365,200	524,000
NEW YORK	571,694	612,684	580,924	559,770	565,596	583,658	802,791	772,174	882,810	778,319	798,288	833,414	883,000
PENNSYLVANIA	679,168	686,356	649,215	582,734	607,900	713,621	856,020	850,435	882,925	832,925	826,607	855,000	1,079,000
WISCONSIN	298,457	320,000	303,000	256,720	293,019	303,937	305,787	378,941	381,152	458,834	471,792	628,043	621,000
Total	2,671,955	2,865,888	2,804,240	2,571,315	2,688,574	2,891,514	3,524,596	3,389,590	3,742,989	3,712,970	3,593,852	3,878,657	4,416,000

FATAL ACCIDENTS

MAINE	13	8	9	7	9	7	14	3	15	15	19	15	19
MICHIGAN	35	30	26	29	33	31	24	30	23	28	25	23	25
MINNESOTA	29	19	25	26	19	23	31	24	23	30	10	20	38
NEW YORK	28	36	32	14	7	23	11	18	20	18	13	17	15
PENNSYLVANIA	43	26	26	27	23	37	29	29	23	25	16	25	24
WISCONSIN	22	18	27	17	16	22	27	11	17	15	15	16	16
Total	170	137	145	120	107	143	136	115	121	131	98	116	137
Deaths per 100,000 Licenses	6.4	4.8	5.2	4.7	4.0	5.0	3.9	3.4	3.2	3.5	2.7	2.9	3.1

NON-FATAL ACCIDENTS

MAINE	12	25	14	16	24	10	29	16	29	17	38	53	51
MICHIGAN	77	119	117	133	163	162	181	217	147	173	190	200	234
MINNESOTA	64	75	70	70	62	51	62	68	78	142	92	111	129
NEW YORK	159	187	158	85	99	94	93	78	93	115	100	124	110
PENNSYLVANIA	419	370	327	191	209	232	337	426	418	453	449	386	362
WISCONSIN	85	72	68	48	60	47	71	51	49	76	88	128	100
Total	816	848	754	543	617	596	773	856	814	976	957	1,002	1,012
Accidents per 100,000 Licenses	30.5	29.6	26.9	21.1	23.0	20.6	21.9	25.3	21.8	26.2	26.6	25.8	23.0

TOTAL FATAL AND NON-FATAL ACCIDENTS

MAINE	25	33	23	23	33	17	43	19	44	32	57	68	70
MICHIGAN	112	149	143	162	196	193	205	247	170	201	215	223	279
MINNESOTA	93	94	95	96	81	74	93	92	101	172	102	131	167
NEW YORK	187	223	190	99	106	117	104	96	113	133	113	141	125
PENNSYLVANIA	462	396	353	218	232	269	366	455	441	478	465	411	386
WISCONSIN	107	90	95	65	76	69	98	62	66	91	103	144	122
Total	986	985	899	663	724	739	909	971	935	1,107	1,055	1,118	1,149
Total Accidents (Fatal and Non-Fatal) per 100,000 Licenses	36.9	34.4	32.1	25.8	26.9	25.6	25.8	28.7	25.0	29.8	29.4	28.8	26.1

It's fishing derby season

Kids' fishing derbies have come to rank with hot dogs, soda pop and sunburns as sure signs of summer. No one is quite sure just where or when the idea first germinated, but anyway the Conservation Department is busy each summer, in co-operation with civic and sportsmen's clubs, stocking city park ponds with thousands of perch, bullheads, sunfish and rock bass for the "bent-pin" tribe.

The fish, netted by the Department's fish salvage crews, come from waters closed to or not used by the public for fishing. The freckle-nosed kids, most of whom never have a chance to go fishin' elsewhere, come from "down the block."

So far this season, the Department has stocked fish in some 20 different communities for the kids "around the corner." One such stocking was made in the pond at Staten Island's Willowbrook Park. The picture above shows contestants lined up awaiting the starting flag in the annual Staten Island fishing derby and the "Huckleberry Finn" contest staged by the A. E. Zimmer Fish and Game Association.

S. C. S.

Hal Jenkins, regional information division chief, U. S. Department of Agriculture Soil Conservation Service, has released a resume of SCS work for the 1952 fiscal year in New York State. It shows an increase of 93 per cent in the number of co-operators over 1951.

In 38 soil conservation districts in the State, 6,052 farmers owning 795,000 acres became new co-operators. Full basic conservation plans on 267,000 acres were developed by 2,357 farmers, and 3,695 farmers began conservation work on 528,000 acres. The year closed with 22,937 co-operators, owning 4,163,636 acres.

SCS technicians also aided 4,000 agricultural conservation program participants (863 of whom were not district co-operators) with permanent-type conservation practices.

Greatest increases in conservation practices were established in mulching (106 per cent), farm drainage (95 per cent), covered drains (74 per cent), shore erosion control (73 per cent), contour furrowing (64 per cent) and farm ponds (54 per cent). Rip-rapping work increased 44 per cent, fish pond management jumped 39 per cent, hedges increased 30 per cent and improved water application work was upped 28 per cent. Tree planting showed the smallest increase—only up 1 per cent over 1951; woodland improvement, however, was up 11 per cent.

Notes

The Federation of New York State Bird Clubs is looking for a substitute for the present lead pellets used in shotgun shells. The idea is to eliminate the lead poisoning which kills many ducks winged or wounded by lead pellets, as well as those which take the shot into their intestines while feeding over gunned areas.

Says a newspaper release from Sault Ste. Marie, Mich.: A leather company has signed a contract with a fur and leather workers' union making the first day of deer season a paid holiday.

Important decision

Plantation thinning operations are actually "Silviculture" within the meaning of the term as used in Code 0109, established several years ago (as the result of recommendations from the Conservation Department) by the Compensation Insurance Rating Board established as a special classification available to Forest Practice Act co-operators or to consulting foresters working in the woods of such co-operators.

This code was intended to cover silvicultural operations in which the primary purpose was the improvement of growing conditions for the residual stand and where a stumpage return, if any, was incidental. The initial rate was approximately 40 per cent of that for "logging and lumbering." As with all new rates, there have been differences of opinion as to where Code 0109 was applicable. These have now been resolved.

To show how this may affect you:

Application for the silviculture rate of Code 0109 had been submitted on a thinning operation in a 25-year-old, 30-acre red pine plantation in Columbia County. A local consulting forester began the thinning for an FPA co-operator; 50 per cent of the trees were removed by cutting out every seventh row and thinning the intervening rows. Several other variations maintaining the 50 per cent figure also were tried. The material was sold to a post-and-rail fence maker. The co-operator was willing to forego any income from the stumpage simply to get the thinning done.

At first, it was thought by the insurance carrier that this operation should be classified as "logging," but further investigation (together with some representation from this Department) were sufficient to convince the carrier that the operation really belonged under Code 0109.

The decision in this case is important, not only for the particular owner involved but for the fact it establishes: That plantation thinning operations are actually silviculture within the meaning of the term as used in Code 0109. The difference between this rate and 2702 (Logging) is such that the use of the former makes this a going operation and puts it just a little way into the black. Had the "logging" rate been applied, the job would have required the investment of additional capital by the owner and might very well have been left undone, to the detriment of the stand. As it is, the plantation is receiving a timely thinning, wages are being paid, useful products extracted and the landowner at least is coming out even.

LETTERS

To The Editor

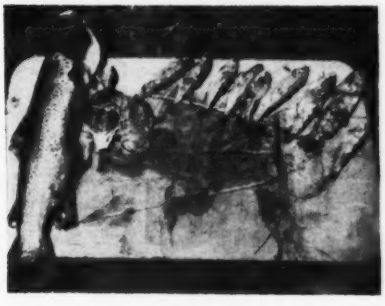
Tag or button?

Dear Sir: Judging by the interest of many of your readers and the backing of the Department, it seems inevitable that eventually there will be a visual means of license identification for the hunter (fisherman and trapper?). I am all for the idea as a curb on license violators, and it should alleviate the present situation to a great extent.

But to get down to brass tacks, there seems to be two means of identification suggested so far: The cloth tag and the metal button of previous years. Personally, I favor the metal button, mainly because it is easily transferrable to different types of clothing and never need be covered. With the sewed, cloth tag a sudden change in weather or plans might make the transfer of the tag very inconvenient.

Kenneth C. Brett, Seattle, Wash.

• *As we see it, the trouble with the button plan is this: If the button is to have any real value in identifying the licensee at a distance, it would have to be so large as to be a nuisance. Meanwhile, we are trying to solve some of the problems you mention by checking the experience of other states.—Editor*



The limit

Dear Sir: You no doubt have read some of Ripley's "Believe It Or Not stuff." But this stops that old boy: The limit of trout on one cast, nine rainbows and one brown.

I like to get up in the morning to do my fishing, and believing in the old saying that the early bird gets the worm, usually start out at daylight. This season I have been having trouble up on the Warner Kill—which as you know is in the woods near Lewisville; there seemed to be sort of a dead section of stream, where before I caught plenty.

On May 16th I gave this section one more try, and I found out who had cleaned it out; it was a brown trout, an old buck that dressed 5 lbs. In his gut were nine rainbow trout from 4½ to 8½ inches, 8 of which had been taken just a short time before I got there. It took about 20 minutes to land this old dog, plus a few hundred yards of stream.

Sending picture to prove this yarn; can also furnish witness to the opening of fish. When the Hell does the next issue come out?

Floyd Smith, Phoenicia

Fox comment

Dear Editor: Have just finished reading the piece by R. B. Colson (June-July) entitled, "Foxes on the Move," and feel that he has enlightened a great many landowners. Recently I spent quite a bit of time with Walter Baker, the State trapper from Maplecrest, on his line, and wish to state that this man has a score of 125 foxes within a 9-week period in Greene County alone. Many of these foxes were trapped within very short distances of poultry farms, where many of the owners put their losses to the raccoon and skunk.

The amount of money spent on the control of rabies is minute compared to the value of livestock that is lost each year due to the fox.

Lawrence F. Ross, Windham

Ski-footed

Dear Editor: The letter in your June-July issue from Mr. V. M. Kraft with reference to the ski-footed deer caught my eye for a special reason. Very recently I visited the Rochester, N. Y. Durand Park zoo. There I saw a horned sheep, species and origin forgotten, which had malformed hooves closely resembling those of the deer pictured. I suspected at the time that something had prevented those "toe nails" from wearing down in the usual manner.

Malcolm E. Smith, Falls Church, Va.

.22 Shot shells

Dear Editor: Regarding that question from Jon Crawley from Clifton Springs about "bird shot" in .22 caliber: Have used thousands of them. Just ask for .22 long rifle shot shell. Nearly all sport shops have them. They will kill English sparrows at 60 feet and are the best medicine I have ever found for barn rats. Rats drop dead at 40 or 50 feet. Used inside a barn or other building, they usually don't even break glass except a head-on shot at under 30 feet. Most of the 45 tiny shot will land in a two-foot circle at 20 feet.

One word of warning, don't shoot them in your pet rifle or pistol; they don't do the rifling any good. And don't use them in a tubular magazine, as they are crimped at the nose and will sometimes jam. Box magazine is O.K. Best thing is an old rifle of the single shot type or one of the smooth bore with card-board choke tube which have been built for their special use.

They are good practice and swell fun when used with the light clay targets made specially for them. I think these light targets are listed in Stoeger's "Shooter's Bible." Just remember, "never point a gun at anything you don't intend to shoot"—even with .22 shot shells.

Ray A. Logan, Jamestown

Dead pigeon

Gentlemen: This band (enclosed) I found on the leg of what looked like a street pigeon. One leg was all that was left of the bird. The band has the following number—AU50KY-50447.

I found it in NYC on Claremont Ave. by the Riverside Church. The bird could have been killed by a cat, by a car, by small birds of prey which are nesting on the top of the Riverside Church.

I am sending it to you in case the person who put it on would be interested.

Boris Spassky, New York City

• *The band is that of a racing pigeon, and we are forwarding a list of registered bands for such birds, with the suggestion that you write the owner indicated by the initials on the band you recovered.—Editor*

Casualty

Dear Editor: Enclosed is a photo of a fawn which may be of interest. The State Police, on May 4, 1953, were called to Coupe Hill in the Town of Frankfort, Herkimer County, and found a doe with two broken legs, which they were forced to destroy. Joe Maddy, our local Game Protector was called, and he investigated.

Joe established that the doe had been chased by dogs, and apparently tried to elude them by crossing a road. A car hit it, resulting in the leg fractures. When Joe had the carcass dressed out, it was found to be carrying twins, the development of which indicated they would be dropped in a week or ten days. In other words, permitting the dogs to be at large resulted in the loss of three animals—the doe, and the two fawns.

John F. Daly, Herkimer

Rattlesnakes

Dear Editor: The article on rattlesnakes in the Feb.-Mar. issue prompts this inquiry. Our neighbors tell us that in areas where blacksnakes are abundant, there is little chance that there are rattlers. Is this true or is it just another something they want a gullible gal from the city to believe?

Mrs. M. Edwards, Montgomery

• *Blacksnakes have more of an affinity for water than rattlers, so their natural habitat is in or near swampy country. Our northern rattlers stick rather close to ledgy ridges with southern exposures. These ridges often have swamps at their base—a combination rattlers like, as they have to have water, and at such places both varieties of snakes may be found. Such an area is the Ramapo Plateau in Rockland County where you have a combination of lake, pond or swamp and nice warm ledgy living quarters. Rattlers and blacksnakes do not fight, but a big rattler will make a meal of a small blacksnake, and a big blacksnake will swallow a small rattler. The black snake is the faster traveller, so I doubt if many of them are caught by rattlers.*

The king snake, which resembles the blacksnake except for its white belly markings, is the deadly enemy of the rattler, and where they are found rattlers are scarce.—A. T. Shorey

Time check

Dear Mr. Davis: Enjoyed your article, "Use of the Pocket Compass," in the May-June issue. I fully realize that you did not intend to elaborate on the finer points of navigation by compass, but permit me to add a word or two about the time element—which in my estimation is a most important factor.

As for me, I always keep track of my departure time when entering the woods on a long hike, especially in strange territory. It is then quite easy to locate yourself approximately, and also a reasonable E.T.A. (estimated time of arrival) can be worked out for your return trip. Mental notes or a log can be kept to take care of rest periods, changing course, or even the tracking of a wounded deer.

There is no doubt that many a lost person was on the right course on his return trip, but failing to have an E.T.A. became panicky, started to wander aimlessly and thus became hopelessly lost.

Dan Mueller, Niagara Falls

King-sized wabbit

Dear Sir: In the last two years I have seen rabbits or hares in Dutchess and Columbia counties that would weigh in the vicinity of 10 to 15 pounds. I started one last season near Amenia. It had dug or scratched a bed in the dirt and leaves about 15 inches in diameter. It hopped only about 30 feet and stopped to look at me. When my beagle came up it went away. My beagle seemed reluctant to give chase. Yet she is very good on the ordinary type of rabbit.

Is this animal an imported European hare? Are you allowed to kill this animal?

Rodney D. Risley, Chappaqua

• *That's what it sounds like; if so, you're in the clear if you pot him.—Editor*

Bird trapping

Gentlemen: Can I legally trap sparrows (English) and starlings? I know the different birds and only wish to get rid of those two menaces to native bird life.

Katherine B. Townsend, DeRuyter

• *A permit is required, the reason being that bird traps usually take protected as well as unprotected species.—Editor*

Color plates

Dear Editor: I was delighted to see the June-July issue with the article entitled, "Beachcombings," by Al. Bromley. The illustrations are particularly well done, including the center leaf and the cover. I would like very much to have copies of these two illustrations suitable for framing if that is at all possible.

Carl B. Stoye, Sayville, Long Island

• *We have had many similar requests for reproductions of this and other color work printed in the magazine. We regret that all we have to offer are additional copies of the magazine; we can't afford separate printing.—Editor*

Indian River Company

Dear Editor: In your issue of June-July, 1953 I note a statement regarding Lewey Lake outlet which is incorrect. The statement (on page 39) is in reference to an inquiry by Mrs. Rhea Klose of Johnstown, N. Y., as to why Lewey Lake outlet was drawn so low. You answer: "Water levels here are controlled by the Hudson River Regulating Board." This is incorrect—the Hudson River Regulating District has no control whatever over Indian Lake, which is owned by the Indian River Company.

For a history of Indian Lake Reservoir I would refer you to page 18 of the "Report on the Water Power and Storage Possibilities of the Hudson River," which was issued in 1922 by the New York Water Power Commission. I am sure a copy of this report will be in your files.

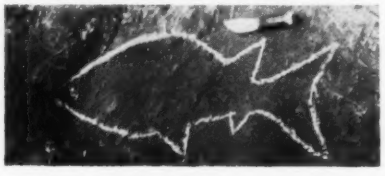
Edward H. Sargent, Chief Engineer, Board of Hudson River Regulating District

Dogs and deer

Dear Editor: My friend and I have a dispute, and I know you can settle it for us. He claims while hunting deer in the Adirondack Mountains during the season, if he came across a dog chasing a deer he has the right to shoot the dog. I say no. Who is right?

W. A. Kalandyk, Albany

• *Your friend, if he's hunting within the Blue Line—Editor*



Royal fish

Dear Sir: I was very interested in the story in the June-July CONSERVATIONIST by Mr. R. G. Zilliox about the oldest lake trout (?). It seems to be a rather common trait to try to outdo the other fellow in telling fish stories. However, this story has some historical interest which might appeal to your readers.

The largest lake trout I ever heard of was one caught by Anne Savage, the daughter of Joseph Bonaparte (Ex-King of Spain and brother of Napoleon) and wife of Colonel Zebulon Benton. According to the legend as I heard it as a boy, the trout was laid on a flat stone in front of the Benton cottage at Lake Bonaparte after it was caught sometime early in the 19th Century, and Colonel Benton had the outline of the fish chiseled in the rock. This outline is still on the rock.

During my childhood the size of this outline always amazed me because it was so much larger than any lake trout currently being caught. I one day measured the outline, and it was 36" from the notch in the tail to the snout. Unfortunately I have no way of knowing how much the fish weighed, but it certainly must have been a great deal older than the one Mr. Zilliox refers to. It was truly a royal fish.

Horace W. Shoemaker, Baldwin, L. I.

Safe handling

Dear Editor: I refer to Mr. George Gardner's letter on page 39, Feb.-Mar. issue. He tells of a person buying a shotgun and then asking how to load it. I believe that the clerk in a hardware and sporting goods store should have a good knowledge of each of the guns that he sells and demonstrate each gun when he makes a sale.

I have been handling a gun for over 20 years, but I know that if I went into a store they could show me several guns that I would have to ask how to load, and unload. (More guns, I believe, are accidentally discharged while unloading than loading.)

If approached through proper channels, some of the large ammunition companies would probably furnish their agents with dummy shells, without powder or primer, for the purpose of demonstrating their guns. This wouldn't take the place of proper training of new hunters, but would take care of the experienced hunters that buy a new model gun.

L. R. Davey, Altmar

Mud

Dear Sirs: Can you inform me what location in the Delaware River, the river mud is obtained at, which baseball players make use of, in taking mud-baths, as part of a physical training program?

George Berchek, St. Louis, Missouri

• *Suppose we ought to know, but we don't. —Editor*

Muskalonge

Dear Sirs: A recent issue had a map of Honeoye Lake. In the text it listed muskies as a question mark, stating they were stocked but evidently did not reproduce. Do you think they ever reproduced?

Why I ask: The summer of 1940 my uncle found one floating in the water on the southeast corner of the lake. It hadn't been dead long as it was still fairly firm. As I recall it weighed 20 some odd pounds. I have heard of four being found this way, some of which had gashes in their body such as might come from the propeller of a motor on a boat. I have always been of the opinion that fishermen were catching the offspring of the muskies before they were old enough to reproduce, thinking they were large pickerel.

I showed several anglers a five-pound pike I caught in Canada stating it was one of the nicest pickerel I had ever caught. They looked at it very closely but not one of them doubted my word. This leads me to believe that the muskie could provide excellent fishing in this lake if the anglers were educated to recognize the three fish, pickerel, pike and muskie.

Rex North, Canandaigua

• *In the 49 years since the hatchery at Bemus Point was established, muskalonge have been stocked in a good many of our larger inland lakes. In several instances a few large fish have been recovered from such plantings, according to reports. Nevertheless, so far as known, stocking has not resulted in establishment of the species (a successfully breeding, self-maintaining population) in any water in the State. There are two or three places where muskalonge populations may be due to stocking (Findley Lake and the Chazy River, for example) but these are locations where muskalonge probably were native and it therefore seems most logical to assume these are native populations, supplemented but not established by stocking.*

Reasons for the difficulty of establishing muskalonge in new waters have not been determined with certainty. If reports of some survival of original plants are dependable, it seems probable that spawning has occurred in some instances, at least, and that survival of eggs or young is the probable bottleneck. Our own theory is that the three common Escocidae (chain pickerel, northern pike and muskalonge) tend to be mutually exclusive. Except in large waters—the St. Lawrence River, Lake Champlain, etc.—you will notice that generally only one of these three species occurs in each water. One reason for muskalonge failure in this competition may be that pickerel and northern pike spawn a little earlier than muskies and these very predatory little fish may have just enough start on the muskalonge fry to be fatal.—C. W. Greene

Those women again

Dear Sir: Please send me Reprint No. 130 (one of the reprints of our county maps). I saw a friend of mine with one. I've had a tough time; seems like no one is too anxious to tell you when they're biting, and with the women along I want to know just where to go where I'll get away from them. I want to make the most of every day this year.

Harry Averek, Palisade, N. J.

Frog law

Gentlemen: Is it true that frogs may be hunted only during daylight hours?

Paul E. Bechtold, Port Washington

• *The law says that frogs in New York may be hunted only from 7 a.m. to 5 p.m.—Editor*

How many animals? And whose shack?

Dear Editor: Perhaps this photo may be of interest? Real wildlife! The fact that I got it is due entirely to the use of 300 m/m telephoto lens on my Exakta camera (35m/m Plus X film).

The animal group, photographed in the Interstate Park at Bear Mountain, was about 50 yds. distant. I spotted the deer, and while preparing to take the photo the rabbit appeared from the rock crevice. And as I was focusing the lens, the squirrel appeared. It wasn't until I saw the print that I noticed the other deer.

And perhaps this other photo may be of interest to the Conservation Department? According to my notes, this shack is built upon State land upon a line northward from Spotted Mt. to "Hill 2200," near the north bank of the South Fork of the Bouquet River. [Re: Elizabeth quad. topo. map, ϕ 44° 37½" N (lat.) x 73° 4' 18" W (long.).] Built of birch logs and covered with tarpaper, the shack contained stove and bedsprings, etc., all of which must have been carried "in" over the trail from Lily-pod Pond from along the North fork of the Bouquet River.

A. Walton, Jamaica

• *This letter was forwarded to District Forester Petty in Saranac Lake, who had an investigation made. The shack was found to be on State land, therefore illegal, therefore was destroyed.—Editor*

Trouble with evergreens

Dear Sir: I enjoy the magazine very much. I wonder if I can get some advice on my evergreens. I have two small firs on which some kind of white downy stuff settles on the trunk and branches. They are not doing well. I also have two pines on which the branches are dying from the ground up. They are all growing. Is there anything I can do that will help?

Mrs. Ernest Anderson, New Berlin

• From your description, I judge this is one of the aphids called "Wooly aphid" from the downy white covering within which the insects live. Usually, these insects in themselves are not particularly harmful and can often be destroyed merely by directing a stream of water against them with a garden hose. However, their presence in any abundance often indicates a state of low vitality in the tree, and this can sometimes be corrected by working organic matter such as humus, well rotted manure or compost in the area for some distance around the base of the tree.

The dying of the lower branches is a natural process in evergreens and results from the cumulative effect of shading from the upper branches. The best thing is to remove these branches as soon as they appear to be dead, using a saw and cutting them off as close as possible to the trunk of the tree.—E. W. Littlefield

Smokey bear

Dear Sir: Usually when an Observer reports on conditions at a fire tower, he reports too often of some form of vandalism; either bullet holes, window breakage, insulators shot up on the telephone line and various other expressions of the inanities common to the juvenile delinquent.

It was a refreshing surprise to find in the enclosed photo a bit of fitting decoration on a picnic table at Hartzfelt Fire Tower south of Olean. Observer Clem Gerringer sent in this photo of a painting by 12-year-old John Pfeiffer of the west branch of Four Mile Road, R.F.D., Allegany, N. Y. The painting is in color and very well done.

H. E. Krueger, District Ranger

Danish trout

Dear Sir: Last week for the first time I saw frozen trout for sale in our local super market, and being a great devotee of this delicacy, immediately bought it. It said something on the package about Nevada, so I assumed it came from out West. But on closer inspection another part of the package bore the legend "Produced and packaged in Denmark." When I opened it, each fish had on its tail a tag marked "NYS CD."

What is the explanation of this international fish?

Mrs. David Sive, Pearl River

• The tag is one issued by this Department in connection with the importation of trout from Demnark—as a nation, one of the largest producers of "table trout." Mainly to protect our own wild trout, this Department requires that such fish be tagged before they are offered on the market. Tags are purchased from the Conservation Department by importers. They ship the tags overseas to commercial trout hatchery operators who are licensed by the N. Y. S. Conservation Department to import commercially propagated trout into New York State. The self-locking tags are affixed to the trout which are then sharp-frozen prior to shipment. Last year, Danish fish culturists shipped about two million trout (mostly rainbows) into New York. —Editor

Ode to a purist

(Who usually carries a can of worms in an inside pocket)

Breathes there an angler, with ardor so dead
Who, during winter, to himself hath not said
"This season I solemnly promise that I
Will never substitute bait for the fly."

So the long frigid nights find him busy with vise
Tying dry flies, wet flies, buck-tails and mice
Of feathers and fur, bound with nylon and such
Of gosh awful colors which won't matter much
For returning from some future foray on trout
He'll exhibit his catch to the neighbors, no doubt
And they ask what he used, with pride he'll confirm (??)
That the biggest and best were hooked on a worm.

This should get a rise out of some fly fishermen.

V. O. Sturtevant, Poughkeepsie

The real villain?

Dear Editor: In your October-November issue (page 39) Mr. Schonbrunner of New York City sends you a photo of a large brown trout which he thinks was injured by a spear in the hands of some person. This could, of course, be a fact. But I think it more likely that the damage was done by a blue heron; the marks left by their rapier-like bill on the back and sides of any fish are very much like those left by a spear in the hands of a man.

Blue herons will kill and eat smaller trout and other fish but if they are too large to swallow, they just kill them. I have seen this done on two different occasions. The blue heron is protected by law, but I believe they destroy more trout in a year than are caught by any enthusiastic fisherman.

J. Frank Case, Kirkville

Campsites

Gentlemen: We have camped in the public campsites of the Adirondack Park for several years and were at one of them through our vacation last year. We have a great deal of praise for the campsites and the many facilities offered to campers and are thoroughly in favor of the small charge which is being made for the use of these campsites.

However, we are wondering if the hundreds of picnickers and visitors to these campsites should not be charged a small fee for each car entering. Many of them, instead of using the toilet and other facilities provided for them in the picnic area, insist on taking over those in the camping area. They have the same chance of using the bathing beach as the camper. We realize such a charge would be extra work for the caretaker, but believe it would be worth it in many ways.

E. V. Schlick, Attica

YOUR SUBSCRIPTION

To Renew: Use application furnished. Mail early! Late renewals will miss some issues.

Change of Address: Notify your Post Office. Notify this office on Form 22-S which may be obtained from Post Office Dept. Enclose address label from your last copy if possible. Sorry, we require six weeks to process change.

Gift Subscription: Please inform this department whether it is new, or renewal of old subscription.

Golden shiners

Dear Sir: I have recently been chastised by some well-meaning fishermen for using golden shiners for bait. They maintain that the golden shiner is a young carp. My first reaction to such a charge was one of bewilderment, since the golden shiner is a very popular hard-to-beat live bait. Although I have explained that these shiners may be purchased at any bait shop and thus could hardly be young carp, the camp is still divided on the issue.

Bill Bowers, Schenectady

• You are perfectly correct in using golden shiners as bait. Although carp and golden shiners both belong to the minnow family, they are very distinct in many ways including growth rate, size attained and habits.

The easiest way to distinguish a young carp from a golden shiner is by size of the dorsal fin. In the young carp this extends from the middle of the fish about two-thirds of the distance to the tail, whereas the golden shiner has a comparatively short dorsal.—C. W. Greene, Sr. Aquatic Biologist

Stanley heater

Dear Sirs: In the Feb.-Mar. 1949 issue you have a picture of a Stanley Columned Heater, large, about 1845 date. I have one in very good condition that I would like to dispose of.

Antique dealers that I have talked to in the Syracuse area do not seem to know anything about them. Could you give me any information as to a dealer who would be interested and some idea as to the stove's value?

Mrs. J. K. Kinney, Syracuse

• I happened to have done the article on Wood Stoves you mention. There are not many stove dealers, true, and few antique dealers realize the value of these old wood burners. In doing research for this article I happened across an old gentleman here in Albany at a furnace, stove and repair concern, who had a small collection he showed me. He told me he kept them for sentiment's sake and had reluctantly parted with one only a few days before I interviewed him. His sentiment on this—and I believe it was a Stanley—was worth $120!—R. B. M.

Infection in deer

Dear Editor: This past deer season some of our club members came upon a deer which was covered with what we think were tumors. It was in such bad condition that even its eyes were covered. Needless to say, the buck was destroyed.

Albert Walter, Sparrowbush

• *The condition observed was probably one of infectious skin tumors, limited to the skin but capable of killing deer through mechanical obstruction to eating, breathing or to sight. We believe this to be a virus disease transmitted by blood sucking insects from one deer to another, but not infectious to man or his domestic animals. Around one per cent of our deer may be expected to have one or more skin tumors noticeable to the casual observer. Occasionally the infection seems to run wild in a deer and may kill it within a year. This would seem to be the case with the animal you observed.—E. L. Cheatum*

Jarred squirrel

Dear Editor: I noted something unusual and a menace to game. Last fall I saw a gray squirrel with a glass jar on his head, such as baby food comes in. There is always a little food left in these jars. I managed to get a hold of the jar and helped the thin squirrel free. He went off chattering. Just think of the number of baby food jars deposited in dumps around the country and cities.

Milton S. Bookstaver, Montgomery

Stamp for woodcock?

Dear Sir: Please advise by return mail answer to a question which has created many differences of opinion: Is a duck stamp required for woodcock? It's my feeling that it is not required, although a woodcock is listed as a migratory bird.

Ralph Girardi, Sr., New York City

• *No stamp is required.—Editor*

Moon shell

Gentlemen: The current issue of THE CONSERVATIONIST reminds me that you may be able to answer questions about the shore as well as the woods—which I usually think of your Department as handling. I wonder if you can tell me what the collarlike formations are that we have found on a beach in this area in the past few weeks. They appear to consist of sand held together with some mucous matter. When wet, they are flexible and when dry are rather firm, although they can easily be broken. The collar has an extremely smooth surface and is of uniform thickness. The bottom edge is fluted into fairly even small ruffles. The shape as drawn from memory is shown here. The bottom diameter is about 3½ inches.

Miss Katharine Irwin, Providence, R. I.

• *The collarlike formations are the egg cases of one of the common large molluscs called the moon shell (Polinices heros)—Figure 20, June-July* CONSERVATIONIST.*—A. W. Bromley*

Drumming

Dear Editor: While rowing on lakes in the Adirondacks, my friends and I have heard on clear sunny days a sound that has puzzled us. From a distance we hear put-put-put and it sounds exactly like a one-cyl. gasoline engine starting up. After the first put-put-put, a second later we hear it repeated, then again. Could this be some kind of a bird?

Wilford Lalonde, Edwards

• *What you heard was a male ruffed grouse drumming. This activity has been noted in every month of the year—and at most any time of day or night. The cock partridge makes this noise by a rapid beating of its wings—usually while perched on some elevation such as a log or rock. The purpose of such drumming has never been definitely established, but one writer has referred to it as "an invitation to love or war."—Editor*

Post mortem, rigor mortis?

Dear Editor: Dr. Greeley, in discussing the Lake George salmon, says that "fish stretch slightly when dead." Let me add to that the comment of another eminent scientist, Mr. Cameron Hardenburgh of (or near) Roscoe, N. Y. He told Harry Darbee that "the trout is a funny animal: it keeps on growing after it is dead." Let me add that both salmon and trout not only grow but frequently keep on multiplying after they are dead.

T. T. Tinckerberry, M.D.

Poisoned deer?

Dear Editor: Will you please tell me if deer eat anything poisonous, such as laurel? If so, does it make them sick?

Walter C. Whitmore, Binghamton

• *Generally, deer do not eat anything that might be poisonous to them; the going would have to be pretty rough to get them to eat laurel—which will poison them, however, if eaten in any quantity.—Editor*

Prison

Gentlemen: In connection with the letter "Illegal Killing" on page 37 of the Dec.-Jan. issue, I am fast coming to the belief that the only way to overcome this increasing problem is to make a prison term the penalty. I have heard some say that if they get caught they only have to take that many more deer in order to keep ahead of the fines. There were many more deer hereabouts last spring and summer than were seen during the recent "season."

George W. DeForest, Trumansburg

Credits

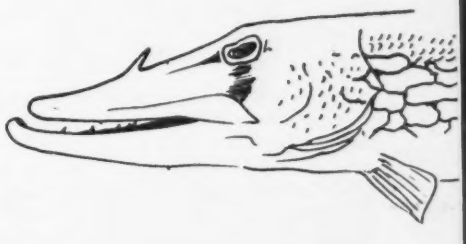
First cover, pages 20, 21, Natural History of New York, Part I, Mollusca, Crustacea; 2d cover, 24, 25, P. W. Fosburgh; 2, J. C. Robert; 5, 6, 7, 8, 15, 16, 17, 26, 29, H. Wayne Trimm; 10, 11, Alfred W. Eipper; 18, Field Book of Seashore Life, R. W. Miner; 27, Nick Drahos; 28, Clayt Seagears; 32, W. J. Embler, Middletown Times Herald; 34, N. Y. Daily News; 4th cover, Hugh P. Crisp.

Horned pike

Dear Sir: I noticed in the June-July copy an article on a horned pike caught by Mrs. William Cramer, Jr. Thought that you might be interested in a chain pickerel I caught in May, 1951. I am enclosing a sketch of the fish, and a copy of Ripley's "Believe It or Not." I have the head of the fish mounted and on display; the measurements of the "horn" are: 1 inch long, 1/8 inch in diameter at the base. It ends in a sharp point.

As in the case of Mrs. Cramer's fish, there is no scar on the head and the horn seems to be composed of natural tissue. Can not top Mrs. Cramer with a crotch horn pike, but have never heard of another horned pickerel.

Ed. Musson, Aurora, Maine



Dear Editor: I live four miles from Franklin Falls and I do a lot of fishing there. Two years ago I caught a pike there almost exactly like the one pictured and described in your June-July issue. And I know of three other horned pike, all caught in Franklin Falls Reservoir in the past few seasons. But the other three, unlike Mrs. Cramer's and mine, had just one horn. Mr. A. J. Deyo, who rents boats at Franklin Falls, caught one of the "single horners," and two people who rented boats from him caught the other two.

Donald R. McIntyre, Franklin Falls

Dear Editor: After reading your article "Native Goose," in the June-July issue of THE CONSERVATIONIST, I thought you might be interested in knowing that on May 3rd Jack Tanck, who works with the Wildlife Research Lab. at Delmar and was here making a deer survey, spotted a Canadian goose swimming here in Cedar Lake, and told me that it might be nesting here. Guess Jack was right, because about a week ago I was very much surprised to see Mrs. Goose and her young swimming up the lake past the Ranger's Camp. I have never seen any geese nesting around here or heard of any nesting in this area before.

I was also very interested in the article "A Horned Pike" because my brother caught one about 18 years ago while fishing through the ice at the mouth of Squaw Brook on Indian Lake. Two years ago he was telling a fishing party about it and I doubt if they believed it. But I guess they had to before the day was over, because that same day they caught one similar to it. This one was also caught at Squaw Brook.

Robert Barton, Cedar Lakes

The Inside On The Outdoors Series

MOTH MAGIC

ONE night last June a big green Luna moth with a five-inch wing span and long swallow tails fluttered against my window screen. She was attracted by the light. I let her in between the screen and the window. I could tell she was a girl moth by her fern-frond antennae (feelers) which were slender. A male's would be luxuriantly broad. I knew by morning that male Lunas, although rare in my area, would be clustered near her. They would smell her through those broad antennae from miles away!

* * *

One time when I was a kid I read Gene Stratton Porter's "The Girl of the Limberlost" because I was told it had a lot of stuff in it about Nature. And that I liked. Well this book, as I recall it, told all about how a dame spent her time looking for a big lavender and yellow moth called the Yellow Emperor. It was supposed to be so rare that it was worth plenty cabbage. If this dame could find one, she figured it would pay her way through college or something.

I forget how she made out. But I remember how I did.

At that time I was doing a lot of reading of stuff in very small type. I figured it was about the most fascinating reading in the world. It was the large classified ad section of a magazine then known as *Hunter, Trader, Trapper*. One of these ads was by a guy in California who offered to buy moths. It said he paid high prices for the rare ones. At once I became interested in moths.

Meantime, my Aunt Amy had given me Dr. Holland's fine moth book and in it were pictures and descriptions of the Yellow Emperor and its caterpillar—one of those finger-size juicy-looking green ones distinguished by an impressive layout of small horns, knobs and long sparse hairs.

Later, in excited anticipation, I shipped off several Yellow Emperors to the guy in California. I don't remember what I figured to buy with the profits. Probably something extremely impractical — like the baby elephant then being offered for sale in Yardley, Pa. In due time came his letter and I found out that the Limberlost book was full of prunes. For I got only about 15¢ apiece for my specimens, which turned out to be no scarce item on the used moth market.

No matter. By then I found that I was fascinated by the magic of moths. I read everything I could. I used to get our hired man to keep me furnished with stale beer which, mixed with brown sugar and smeared on trees in the woods, lured many kinds. Joe Lloyd, my pal who also was badly bitten by the Nature bug, and I scoured the southern Catskills countryside for moths. In fact, we used to get 'em from caterpillars which we found mainly by looking for their droppings on roads or in shallow water under butternut and hickory trees where most of the big varieties ate. We even got to be caterpillar fecal experts and could tell the species apart by their output—as large as raspberries and, in general, the same shape.

Once we hit the jackpot. We found droppings the size of mulberries. These belonged to the Hickory Horned Devil, largest American caterpillar, nearly six inches of meat and stuff decked with a formidable though harmless battery of orange and black horns an inch long. What a thing. It turns into the Royal Walnut moth—much rarer than the Emperor, its cousin.

I had Cecropias, Lunas, Polyphemuses, Prometheas, Ios, Sphinxes, Cynthias and the other big showy moths and their caterpillars all over the place. I even wrote to Spain to find out how they went about getting Spanish gut from caterpillars. Found out, among other things, that the women put the eggs from their moth farms in a bag suspended around their necks under their inside mantillas, or whatever they use, and let body heat hatch 'em into caterpillars which they later feed mulberry leaves.

I didn't do that but, following other old Spanish customs, I finally did make some pretty fair trout leaders from Cecropia caterpillars. Even thought of going into the business except I felt maybe I'd be kinda shy about recruiting hatching women.

* * *

So when the fairy-like Luna came thumping on the window screen, the memories of moth magic came rushing back.

A big moth like the Luna may lay 200 eggs which take as long as a hen's egg to hatch, roughly about three weeks. The tiny caterpillar immediately begins to eat leaves like mad. A few days later the larva literally walks out of its outgrown skin in the first of four moults that happen a couple of days apart. About three weeks later, when the caterpillar is a fat three inches, it begins to compress itself like a partly closed accordion, marches out on a twig, bends a couple of leaves together and begins to pull from its silk glands the first of about 400 yards of thread. This is fastened with gum around it into a two-inch cocoon. Inside this tough case the caterpillar shrivels further. Then, lo, its skin splits for the fifth time and forth there twists an amazing brown mummy—the pupa. It is smooth and slightly resembles a .38 caliber bullet.

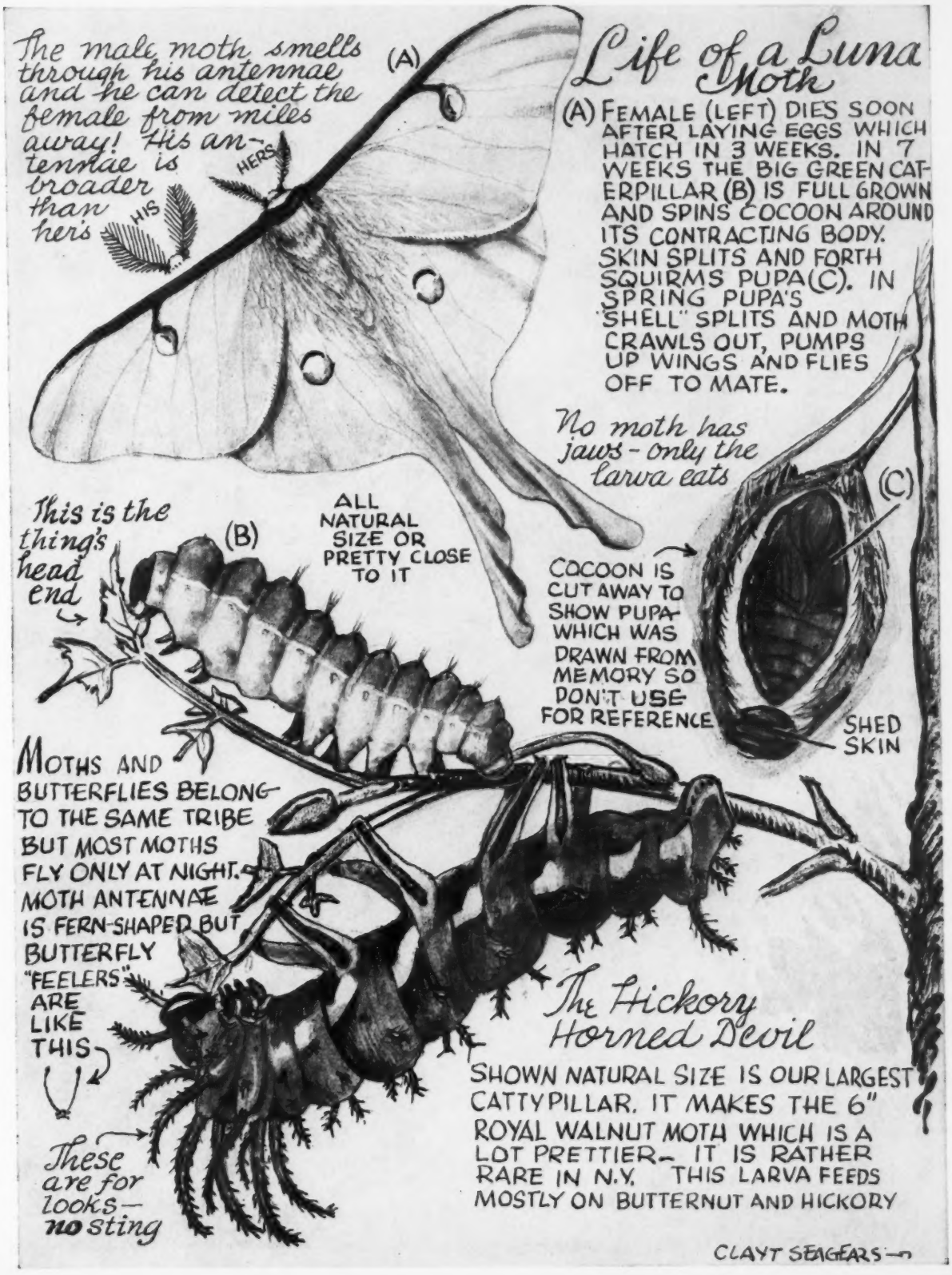
Cut open the pupa now and the internal organs and muscles of the caterpillar appear. But soon disintegration starts and finally nothing but thickish liquid remains. The miracle begins! Little by little the liquid starts to move in countless currents and cross currents. Dissolved caterpillar tissues re-assemble. Floating groups of cells swirl into position. The liquid grows thicker. A chemistry so amazing as to be incomprehensible produces organs and muscles utterly unlike those of the larva.

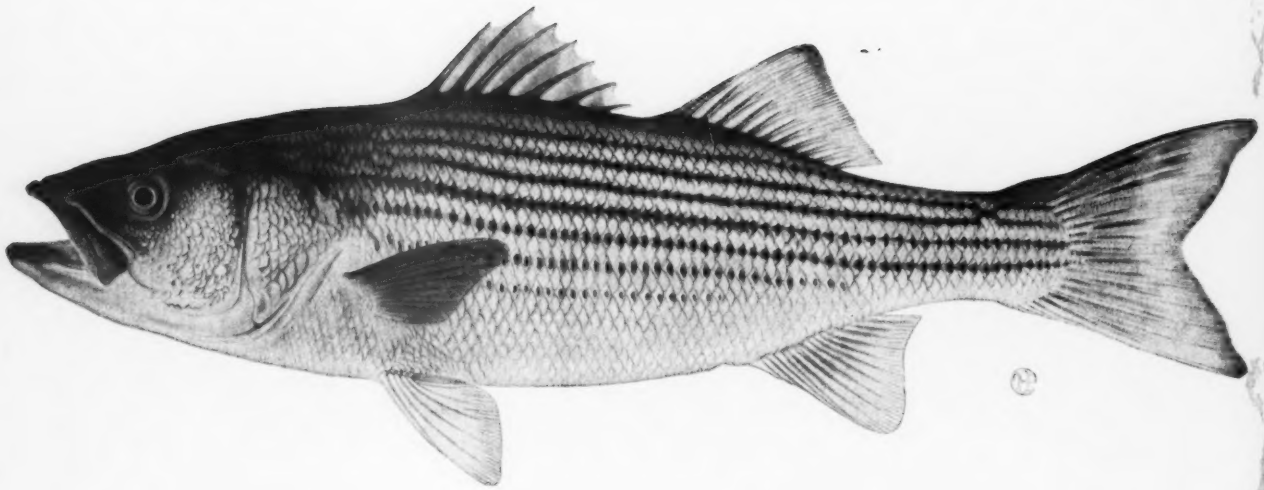
Now the cells of sex arrange themselves. If the moth is to be a female, there must persist what we'll call a memory cell. For she will not eat, and yet she'll lay her eggs only upon the certain kind of leaf relished by her caterpillars! Then, too, from the bits of eddying protoplasm emerge cells to build a chemical factory for the production of the female Luna scent. And if the moth is to be a male, cells arrange themselves into the wide, fronded antennae pitted to expose hundreds of olfactory nerves so marvelously acute that he can smell the subtle scent of the female for miles, following it even through smoke! Yet to us, the moth is odorless.

AND so all winter the cocoon shelters the magic pupa. Then the winds soften with warmth. An inner convulsion splits the pupa case. The new head appears. A secretion dissolves the threads and slowly there crawls out the moth. Her tiny, shrivelled wings are limp. But now secret pumps begin a rhythmic beat and force a liquid into the hollow framework of her wings. It crystallizes. And now complete is the transformation from the repulsive larva to one of the world's most beautiful creatures.

Only a few days she'll live. She'll eat nothing, for no winged moth has jaws. But before her pale green ghostly wings are torn with their beating, she'll bring the males fluttering straight down the aisle of her scent. And on the leaves of hickory, or maybe a butternut or oak, she'll lay her eggs—tiny white bits of protoplasm which hold the spark of such unbelievable enchantment.

—CLAYT SEAGEARS


Life of a Luna Moth
(A) FEMALE (LEFT) DIES SOON AFTER LAYING EGGS WHICH HATCH IN 3 WEEKS. IN 7 WEEKS THE BIG GREEN CATERPILLAR (B) IS FULL GROWN AND SPINS COCOON AROUND ITS CONTRACTING BODY. SKIN SPLITS AND FORTH SQUIRMS PUPA (C). IN SPRING PUPA'S "SHELL" SPLITS AND MOTH CRAWLS OUT, PUMPS UP WINGS AND FLIES OFF TO MATE.
The male moth smells through his antennae and he can detect the female from miles away! His antennae is broader than her's
HERS
HIS
(A)
No moth has jaws - only the larva eats
(C)
This is the thing's head end
(B)
ALL NATURAL SIZE OR PRETTY CLOSE TO IT
COCOON IS CUT AWAY TO SHOW PUPA WHICH WAS DRAWN FROM MEMORY SO DON'T USE FOR REFERENCE
SHED SKIN
MOTHS AND BUTTERFLIES BELONG TO THE SAME TRIBE BUT MOST MOTHS FLY ONLY AT NIGHT. MOTH ANTENNAE IS FERN-SHAPED BUT BUTTERFLY "FEELERS" ARE LIKE THIS
These are for looks — no sting
The Hickory Horned Devil
SHOWN NATURAL SIZE IS OUR LARGEST CATTYPILLAR. IT MAKES THE 6" ROYAL WALNUT MOTH WHICH IS A LOT PRETTIER - IT IS RATHER RARE IN N.Y. THIS LARVA FEEDS MOSTLY ON BUTTERNUT AND HICKORY
CLAYT SEAGEARS



STRIPED BASS
Roccus saxatilis (Walbaum)
From Adult Male 20 Inches Long